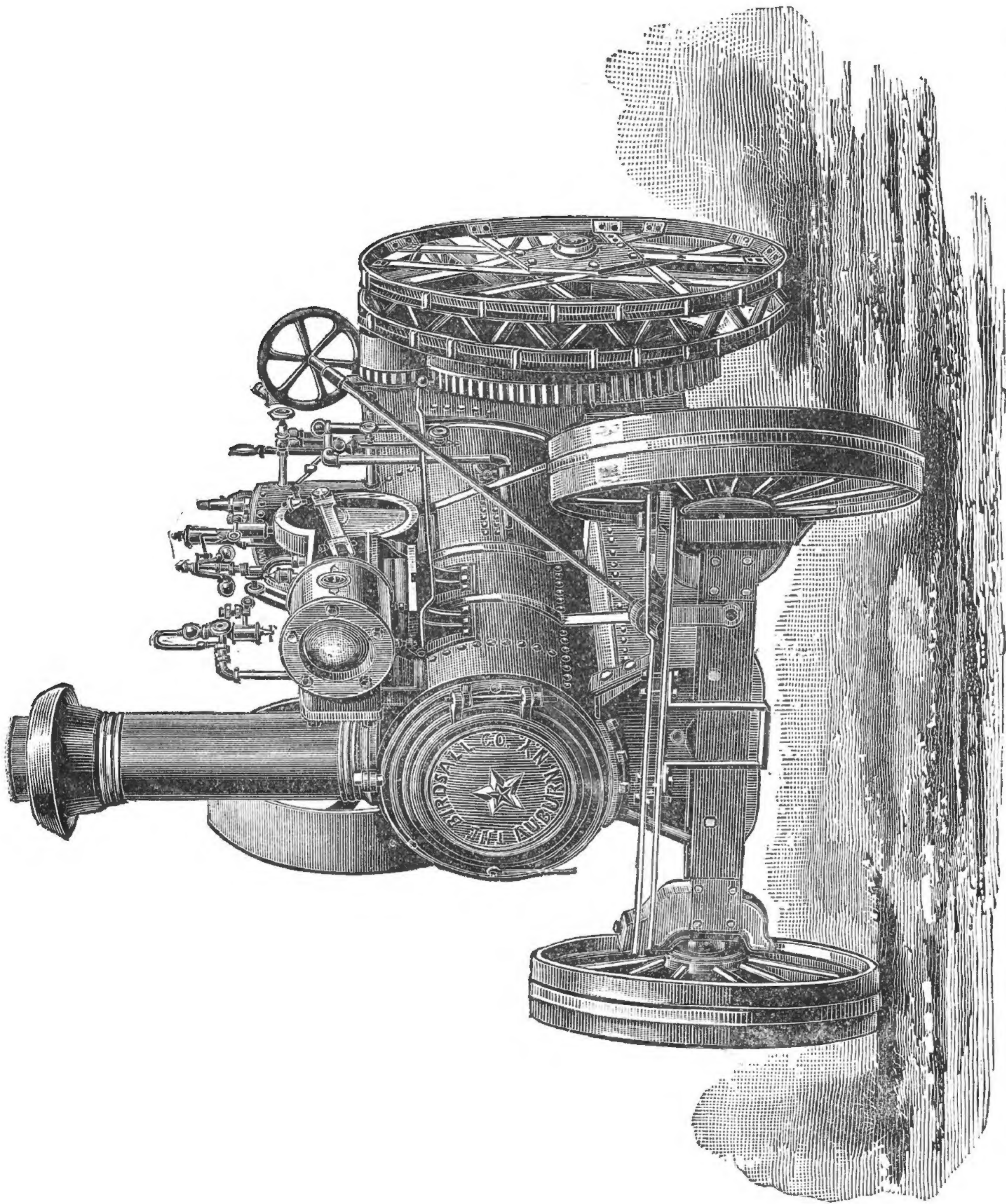




WOLCOTT & WEST, SYRACUSE & AUBURN, N.Y.



FRONT VIEW PATENT STEERING GEAR TRACTION ENGINE.

INTRODUCTORY.

WHEN the little ship, a fac-simile in all respects of the caravel of Columbus, was launched at Palos in 1892, the newspapers throughout the world, in describing the event, spoke of the marvelous improvements in naval architecture and of the awe that would be felt by Columbus, if he could but see an armored battle-ship or ocean greyhound of to-day. Columbus was a seaman, and of course, improvements in nautical matters would interest him most. But if a landsman of his century was to come back from the grave and visit the World's Columbian Exposition at Chicago, he would be utterly overwhelmed with awe and astonishment at the wonderful evidences of ingenuity, perseverance and skill to be found in the labor-saving machinery there exhibited. He would be especially impressed by the vast quantity of agricultural machinery from which he would single out the Birdsall Company's exhibit for the most careful inspection and study. He would be right in so doing, because the most experienced mechanics of to-day are impressed by the excellence of our goods.

We gladly grasp the opportunity offered by the great Exposition, to place our machinery in the lists, where the leading manufacturers of the world contend for its trade.

Our exhibit will be in charge of skilled and courteous men, who will do their best to interest and entertain those who call upon them.

We shall be represented in the field by the same branch-houses as in past years, and by a numerous staff of traveling and local agents in almost every State of the Union.

We have added somewhat to our line of manufactures during the past year, and intend to strive constantly to hold our position in the front.

This pamphlet, our catalogue for 1893, contains not only a description of the machinery built by us, but also numerous letters from its friends and admirers; men who have found their acquaintance with us a source of satisfaction and profit.

THE BIRDSALL CO.,

Auburn, N. Y.

BRANCH-HOUSES:

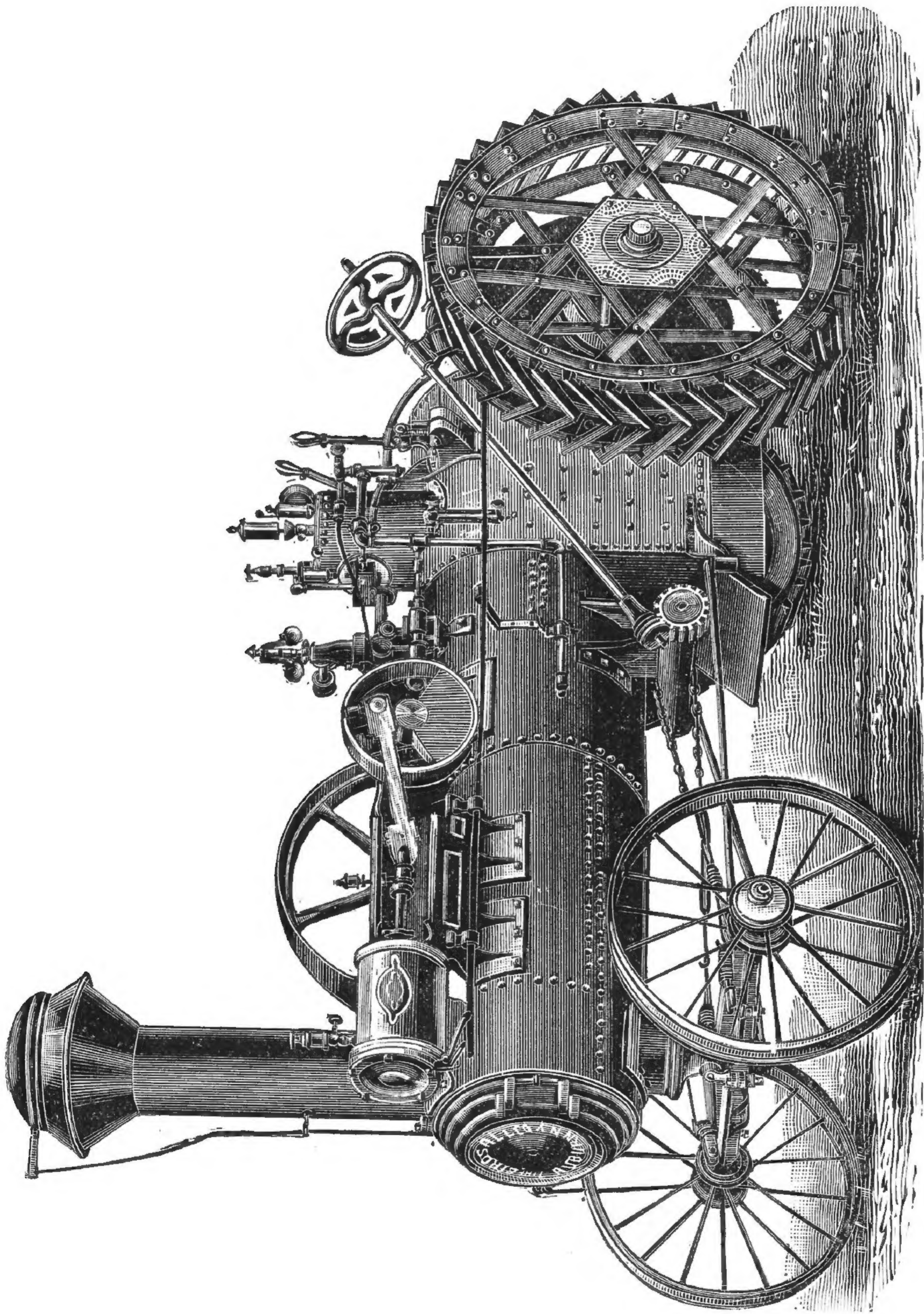
St. Louis, Mo., 316 and 318 South 8th St.

Toledo, Ohio, 234 Lynn St.

Baltimore, Md., 404 South Eutaw St.

Atlanta, Ga., 70 South Forsyth St.

Fond du Lac, Wis., 20 and 22 3rd St.



THE BIRDSALL CHAIN-STEERING TRACTION ENGINE.

OUR TRACTION ENGINE.

Traction engines are rapidly superseding horses for many purposes. They are not only almost universally used in the grain-growing sections as motive power for driving threshing machines, and moving them from place to place, but are also used to a considerable extent for hauling heavy loads on the highways; for hauling stone and ore from the quarries and mines to places of shipment; also for hauling lumber from mills to railroad stations, and for any work requiring power to move heavy loads. We are aware that traction engines have been and still are looked upon by many as being impracticable for the purpose of hauling loads, which fact is chiefly owing to the repeated failures of many engines now on the market of poor design and complicated construction, requiring special skill and expert handling in order to obtain even moderate results, such engines becoming useless for the purpose of hauling loads as soon as they get into wet or sandy soil.

The large and constantly increasing demand for our engines of this class, would indicate that our engine is all that we claim for it; that it is the best traction engine *for all the purposes* for which such an engine is used, as you must concede after reading the following description and examining the cuts:—

Our standard 12-horse tractions, to which the following description and illustrations pertain, are models of neatness, convenience and efficiency. They are constructed in such a manner that *the entire weight of the boiler is supported on springs*, and while they are much lighter than most tractions now in the market, they have ample power to propel themselves and draw a tank wagon and separator anywhere that a team and wagon would be expected to go, and over *softer ground and weaker bridges than most engines dare venture*.

At the same time they are capable of driving the largest separator *to its fullest capacity*, and this, too, without in any way straining the engine, as our success in driving a 52-inch circular saw cutting from 5,000 to 8,000 feet of inch lumber per day, has repeatedly proved.

THE BOILER.—The most important points to be considered, when about to purchase a steam boiler, *are safety, efficiency and durability*. The frequent boiler explosions in the land, from year to year, call for some intelligent investigation into their causes. Were they the result of poor material, poor workmanship, careless management or all three together? These are questions of great importance to steam users and parties who are about to purchase. The use of steam power has increased vastly within the past few years. Boilers of various types and materials have been devised. The combination of different materials in construction, varying greatly in the matter of expansion and contraction under different degrees of heat, have rendered many of these efforts entirely fruitless.

Another point over which a great deal of controversy frequently arises is the *horse power* of boilers. This depends upon the area and proper proportions of heating and grate surface, and in traction engines, *very largely upon the capacity of the boiler to furnish dry steam*; this point depending upon the amount of separating and steam room, which in many tractions has been found to be sadly deficient, causing them to prime when working under a heavy load.

There is no arbitrary rule, which will apply to any and all boilers. Hence, customers are often misled by the statement that a boiler of a certain size is of a certain horse-power. It is important that the area of the grate be not too large; for if it be too large, some places are apt to remain uncovered with coals, and allowing the cool air to rush in, the temperature of the furnace is considerably reduced.

In the construction of the boiler herein illustrated, we have been governed by the requirements as above stated, and have scientifically detailed the proportions, and rigidly adhered to first-class workmanship and the very best of materials.

The boiler is of the locomotive pattern, but not of the ordinary style of portable engines. The tube shell is 24 inches in diameter, made of the best American boiler plate steel, and, as will be seen by the cut, all the side seams are double riveted, thereby insuring at least a third more strength than can be obtained with the ordinary style of single riveted boilers. It contains 46 lap-welded tubes $1\frac{3}{4}$ inches in diameter and 66 inches long, and extends beyond the tube sheet 12 inches, forming the smoke box. The fire-box end of the boiler is of what is known in locomotive parlance as the wagon top form, being made with the sheet which forms the shell of the fire-box several inches higher on top than the tube shell, connecting with the latter by a taper waist, and surmounted by a steam dome, 18 inches high and 13 inches in diameter.

This peculiar arrangement of boiler gives an unusually large amount of separating and steam-room, which in connection with a complete steam separator inside the dome, enables the engine at all times to be supplied with an abundance of dry steam. Another peculiarity of this type of boiler is, that under ordinary circumstances, the tube shell or cylinder part is full of water, and consequently, when the engine is going down steep inclines the water cannot, as in most engines, rush into the front end of the boiler and leave the crown sheet dry.

THESE TWO POINTS.—The arrangement of boiler and steam pipes so as to always supply dry steam to the cylinder, and the construction of boiler preventing the water from leaving the crown sheet dry, when going down hill, are VERY IMPORTANT ONES FOR TRACTION ENGINES; while another important point, looking to the durability and safety of the boiler is, that each fire-box is provided with a fusible plug in its crown sheet which will melt and allow the steam to escape and put out the fire, if at any time the engineer should let the water get too low in the boiler.

THE FIRE-BOX.—The fire-box is 26 inches long, 20 inches wide and 24 inches high, made of the best quality of fire-box plate steel, and is provided with rolling grates, which will be found very convenient for cleaning the ashes and clinkers out of the fire-box, and for keeping the fire cleaned while running. They are actuated by a lever, shown at the rear end of the boiler.

THE SMOKE STACK.—It will be noticed in the cut that we are using on our traction engines a short smoke stack without a hinge. Our smoke stacks are all furnished with a perfect spark arrester, and also a wire screen, which can be raised so as to increase the draft when first starting the fire. The ash-pan is provided with close fitting doors, which can be closed when desired, so that no one need apprehend any danger from the use of this engine around barns or stacks, even in windy weather. They are as safe in all respects as a common stove.

THE CYLINDER.—By reference to the cut it will be seen that the cylinder frame is of the Corliss pattern, and that the cylinder, valve chest, guides, crank-box, valve-stem-guide, and bracket supports, are all cast in one piece, and the cylinder and guides are both bored out at one operation, which insures their *always being in line*. The cylinder has a diameter of $7\frac{1}{2}$ inches and a piston stroke of nine inches, and at the speed at which the engine is required to run (230 revolutions), is guaranteed to develop from 10 to 12 horse-power. It is covered with lagging to prevent the loss of heat, and a neat brass jacket is fitted over the lagging. The cylinder and frame are attached to the boiler by broad, heavy brackets, which are secured in such a manner as to make ample provision for the unequal expansion between cylinder frame and boiler.

THE GUIDES are made concave, which allows the cross-head to travel freely between them without cramping, and the **CROSS-HEAD**, which is fitted with very broad wearing surfaces, is also provided with a ready means of adjustment, so that by simply turning a screw bolt the wear between the cross-head and guides is easily taken up and the adjustment is effected in such a manner that it is impossible for the cross-head, piston and piston-rod to get out of line.

THE CONNECTING ROD is formed from the best refined wrought-iron, and has the proper proportions for the greatest strength, being made unlike any other, and is provided with boxes made of the best composition, having large bearing surfaces, and made adjustable to any possible wear. The whole rod is fitted with the greatest accuracy and care.

THE CRANK SHAFT is made of the best quality of steel, $2\frac{1}{2}$ inches in diameter, which renders it very stiff, and prevents the least spring when run at a high rate of speed.

The crank-pin and crank shaft, are fitted to their exact sizes, and in order to secure greater accuracy of finish than can be obtained by the usual method of shrinking them in place in the crank head, they are forced in under an immense pressure by a hydraulic press.

THE CRANK HEAD is unusually large, and is of a proper weight to exactly counter-balance the momentum of the reciprocating parts, so that under all ordinary conditions the engine may be run at full speed without blocks, "gripes," or any of the usual clap-traps applied to the wheels, to keep the engine in position.

THE VALVE-STEM, PISTON-ROD AND WRIST-PIN are all made of steel, and are, by their several connections, securely maintained in their exact lines of working by reason of the firmness and unyielding rigidity of the frame.

A WATER GAUGE of a very neat design, is provided, and the cylinder cocks may be opened and closed by the attendant, when stopping and starting, without being obliged to leave the place of firing.

The cut represents very minutely the precise location and mounting of all the parts, their proportions to each other, and their general design and arrangement, on the side from which the power is transmitted.

THE GOVERNOR is one of the latest improved design and is universally acknowledged to be the best for threshing engines, on account of its superiority in maintaining a uniform speed of the engine at all times, no matter how much or little work the separator may be doing. This is of great importance in a threshing engine, as it prevents the waste of grain, either by choking up or blowing over. It is provided with a speeder, by which the speed and the power of the engine, while running, can be varied 50 per cent. to obtain the proper speed for the different kinds and conditions of grain to be threshed. The governor is placed just back of the dome, is flanged to the boiler and receives the steam from the top of the dome on the inside; the steam passing through a Superior Steam Separator to the throttle, thence to the governor.

This throttle is within easy reach of the engineer when standing on his platform, as are all other levers used in managing the engine. From the governor, the steam passes through a pipe inside of the boiler, above the tubes, into the smoke-box, and then, by a very short connection, directly into the steam-chest and cylinder. This method protects the pipe from cold air, and consequent condensation, and actually *super-heats the steam*, by coming in contact with the hot flame and gases in the smoke chamber.

The steam-gauges which we are furnishing with our engines this season, are the best that are manufactured. They are imported by a German firm that make more than two-thirds of all the steam gauges used in the world. Our improved pop safety-valve, in connection with the fusible plug in the crown sheet of the fire-box, prevents all possibility of explosion or injury.

THE BLOWER-PIPE.—A "blower-pipe" is also attached to the dome, and leads from it to the smoke-stack, to increase the draft, when it is desired to get up steam quickly. All these devices will be noticed by reference to the cuts.

THE BALANCE PULLEY is turned true and smooth for belts, and is 40 inches in diameter by $8\frac{1}{2}$ inch face.

It is thoroughly balanced, which in connection with the balanced crank head, causes the engine to run very steadily and adds greatly to its durability.

From the gear on the balance pulley the power of the engine is communicated to the traction wheels by a horizontal radial shaft, which is pivoted at the ends in such a manner that the action of the springs, when on stony and uneven roads, does not in any way interfere with the mesh or working of the gears. This feature will be found of great advantage when on the road, and parties intending to purchase tractions, should be sure before buying, that the engine is mounted on springs, for it is well known among threshermen that a traction engine cannot be operated successfully without them, and that by their use, its durability is increased at least one-half, as the constant jar and vibration to which engines not on springs are subjected while on the road, soon work the bolts loose, and especially those which fasten the brackets to the sides of the fire-box. This trouble is often a serious injury, as well as a serious inconvenience.

Do not allow yourself to be misled by the statement of our competitors, claiming that engines cannot be operated successfully mounted on springs, as it necessarily interferes with the meshing of the gears. Examine into the matter yourself and be convinced.

We have greatly improved the counter-shaft and gearing at the rear end of the boiler. This shaft is now driven by a bevel gear at one end, revolves in nicely fitted boxes, and drives the traction wheels by a spur pinion on the opposite end.

THE COMPENSATING GEAR.—The compensating gear which supplies the power of the engine to both traction wheels alike, when turning the shortest curves in either direction, is placed on the axle, and communicates to the road wheels direct, thus making a strong, simple and servicable method of driving them. Our driving axles are made of steel, four inches in diameter, and other parts which show a tendency to weakness have been strengthened by substituting steel for iron.

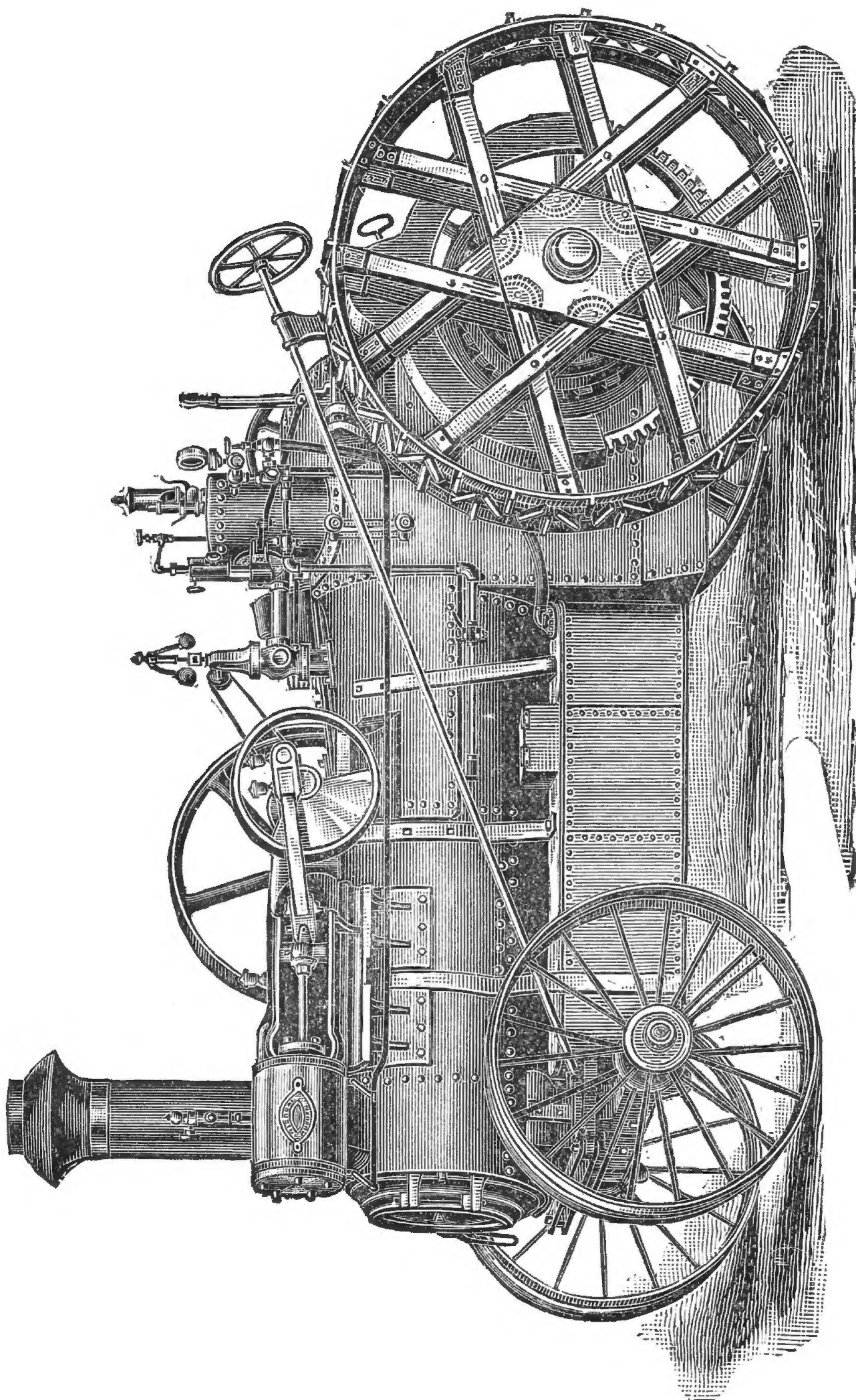
THE TRACTION WHEEL.—In the matter of a traction wheel, it is universally conceded that our patent road wheel with open tire, stands at the head of the list, as it is the only wheel that will run in wet grass or weeds, slippery mud, or on hard roads without extra attachments or changes. It is one of the most substantial wheels made, being constructed of wrought and malleable iron, and is acknowledged by all who have seen or used it to be superior to anything yet employed for traction purposes. The tread or tire of the traction and forward wheels being broad, and the weight on them evenly distributed, in connection with the light weight of the engine, enables it to draw a much heavier load over soft ground and weak bridges than heavier engines could.

This wheel is also particularly adapted to sandy soil, as the open face allows the sand to work through, thus relieving the resistance in front of the wheel.

Many traction engines called first-class, will raise their front wheels off the ground and twist around sideways when the operator attempts to pull a heavy load or to run up a steep incline, but we have never yet been able to raise the front wheels of our engine from the ground while pulling. The reason of this is that the driving axle is placed at the extreme rear end of the boiler instead of being bracketed to the sides of the fire-box.

THE STEERING DEVICE.—By reference to the cuts, it will be seen that the arrangement for guiding the Birdsall engine is very similar to that used on other engines—consisting of a hand wheel, controlled by the engineer, and communicating its motion through a worm-wheel and gear to the windlass upon which the steering chains are wound. These chains are provided with a turn buckle for taking up the slack as they wear, and also with coiled springs which keep the chains taut in all positions, and also relieve the parts from the jar and shocks to which they would otherwise be subjected when passing over rough or stony ground. These chains are fastened to the axle by two pins, and by simply removing these, the chains are detached, when the tongue can be inserted, thus changing the engine from hand-steering to horse-steering at a moment's notice. Our patent steering device can be furnished when required. For description, see page 9.

REVERSING MECHANISM.—Our patent reverse motion is a very simple and efficient device, and is different from the various link-motions, owing to the fact that it does not have from eight to twelve working joints, together with two eccentrics, to be constantly subjected to wear at every stroke of the engine. *It is operated by a single eccentric, and none of the joints are wearing while the engine is in motion except as they are moved by the engineer.*



ROAD ENGINE.

It is a variable cut-off, and will perform all that a link can—stop, start, back, or control the engine perfectly when running down steep grades, thus doing away with any necessity of a brake, and at the same time it is positive in its action, so that the engine can be reversed without shutting off steam, and as improved, is the most durable reverse motion in use.

THE INJECTOR.—For the past few years we have used the Injector exclusively, for supplying our boilers with water, and we feel that it is so much more to be desired than a pump, for feeding boilers, that enough can hardly be said in its favor. *It is much more reliable than a pump*, and there are no valves or movable parts to break or get out of order, and nothing to freeze and burst in cold weather.

It requires no oiling or repairs, and there is no loss of steam or power, as all the steam used to run the Injector is condensed by the feed water and returned to the boiler again, thereby heating the water hotter than a heater would ; and when from any cause a stop has been made, the Injector can be used to fill up the boiler, or keep down the steam, without throwing off the belt or running the engine.

With our traction engines we furnish a flue cleaner, wrenches, oil can, pole and poker.

We are now using as a cylinder oiler for our traction engines a sight feed lubricator, which enables the engineer to see at all times how much oil is being used in the cylinder, and the feed can be regulated as required. These oilers add greatly to the durability of the cylinder, valve and piston.

TESTING.—Before leaving the works, every engine is subjected to a most thorough and rigid test by practical and skilled men, employed especially for the purpose. The boilers are subjected to a hydrostatic pressure of 200 pounds to the square inch, and then run into the testing room, fired up, run, and carefully inspected under steam, and any slight mistakes which may have escaped the Argus eye of the inspector are rectified, and every engine is then required to work up to 25-horse power, as shown by the friction brake. After subjecting our engines to the most thorough and practical tests, we are enabled to fully warrant them, and purchasers can rest assured that when they are filled with water and fired, they will be ready to do their work satisfactorily, and earn for themselves a good reputation.

If parties who intend purchasing traction engines will carefully consider the points of superiority combined in the Birdsall traction, viz: Its being mounted entirely on springs, and of light weight, enabling it to be run successfully on hard roads, or soft and muddy ground, stubble fields, and over light bridges ; its superior facilities for getting dry steam ; its durable and simple reversing-gear which is superior to all others ; its great tractive power, due to its perfect traction, or road wheel, enabling it to draw as great a load as a heavier engine ; its strength, fully 12-horse power ; its excellent steaming capacity, never lacking for steam ; its economy of fuel and water, and the superior excellence of its workmanship, design and finish, we feel assured that they will concur with us in saying that the Birdsall is the best and only traction engine to buy.

OUR ROAD ENGINE.

This engine is adapted to any work that the ordinary traction is used for, but is more particularly intended for hauling freight on the road. The boiler, traction parts, etc., are the same as our 12-horse traction described on another page. This engine is provided with a new style of front axle and steering device, dispensing with the roll and steering chains. This axle is fastened securely to the front end of the boiler by a heavy bracket. It stands parallel to the rear axle and is rigid in the direction of travel, but oscillates in passing over uneven surfaces. The axle arms are hinged to the axle frame, and are provided with lever arms attached to their upper journals, which are connected by a rod at their outer ends. One of these lever arms is provided with a segmental worm gear, which is operated by a screw on steering shaft, and which controls

the direction of the engine by the ordinary hand wheel, both front wheels turning simultaneously, and as they describe different circles they are arranged to conform to the difference of distance which each wheel has to travel. The steering device requires fewer turns of the hand wheel than any other style in use, and enables the engineer to handle the engine more quickly and easily. One man can operate this engine easily. The front axle being perfectly rigid in the direction of travel, the engine will run straight on the road when properly set, thus requiring less attention than any other style of steering device. With this road steering gear, we have ample room to suspend a large steel water tank under the boiler. This tank has a capacity of about four barrels.

The engine is also provided with a two speed gear. This gear is enclosed in a complete housing of cast-iron, and placed on the side of the boiler midway between the crank shaft and the counter shaft on rear of boiler. A shaft runs from the gear on counter shaft to the double gear. The radial shaft runs from the gear on crank shaft back to this double gear and is connected to it by means of a coupling held in place by a steel spring. The shaft can be coupled to the fast or slow gear as desired, by means of a lever furnished with the engine, and can be done in a moment. The speed of the engine with the slow gear is about $3\frac{1}{2}$ miles per hour, and with the fast gear about five miles per hour. We have still another faster gear that will run the engine about seven miles per hour. The steel water tank when used is furnished with a steam ejector for filling the tank with water. A coal box is placed on the platform when desired.

With the engine equipped as above, it is not necessary to draw a water wagon, thus dispensing with that much load. We believe this is the most convenient and complete road engine manufactured, and with our open-face traction wheels, we are enabled to handle larger loads, over soft or sandy roads, than any other engine without being obliged to stop, to bolt on clamps or make any change whatever.

OUR FIFTEEN HORSE POWER TRACTION ENGINE.

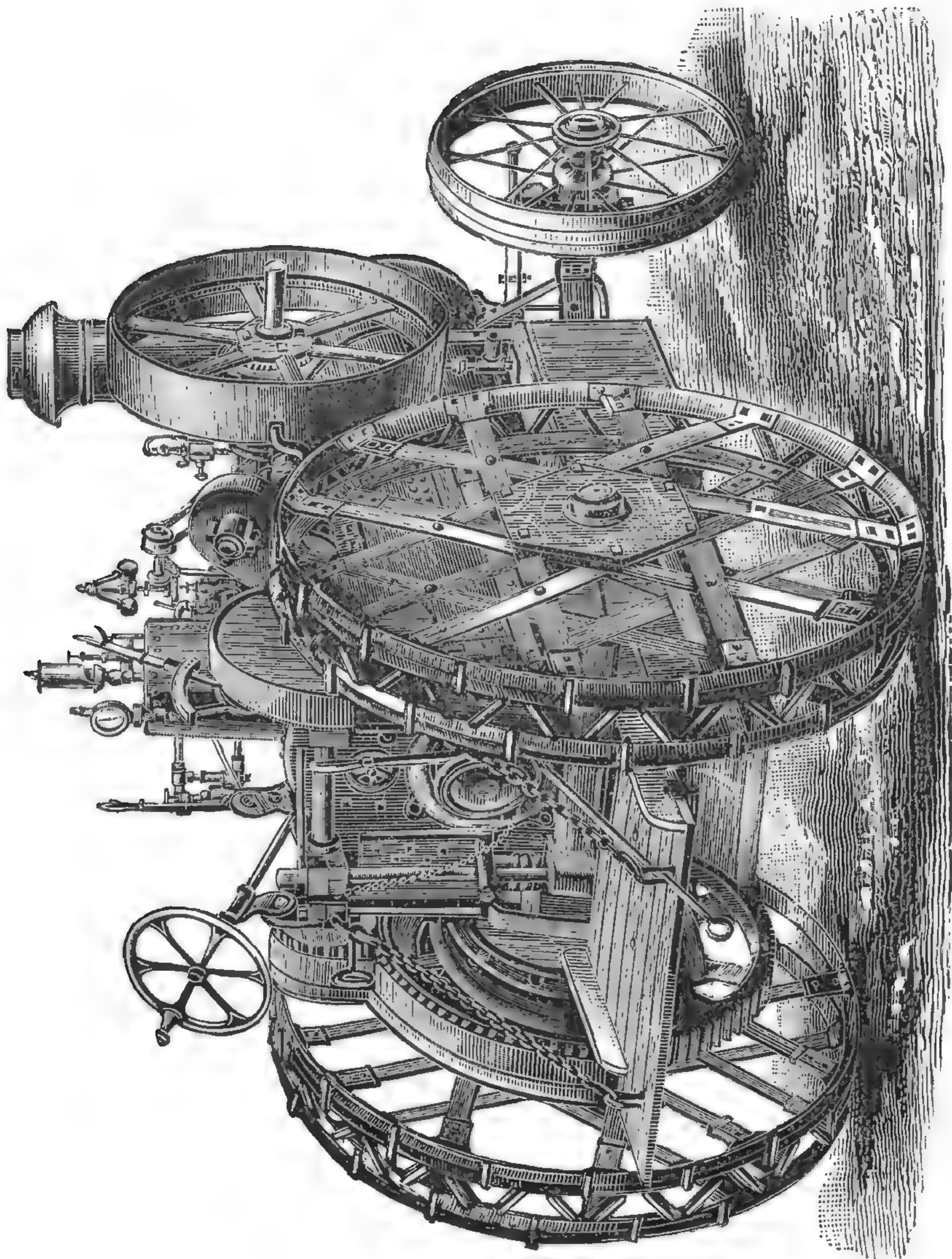
We are building a 15-horse-power traction engine, the dimensions of which will be found in the table on page 15. The engine is similar in every respect to our 12-horse-power traction, and is well adapted to hauling loads where more power is required. It is a good, strong engine, and yet it is not materially heavier than the 12-horse-power traction. While not quite as economical as the latter in the use of fuel and water, it will be found a very useful engine for threshing, shelling corn, grinding feed, or for any other work for which farm engines are used. It will furnish excellent power for a portable saw mill, and is the most powerful and generally serviceable traction engine yet produced by any manufacturers. We also build 15-horse-power portable engines, and semi-portable engines mounted on skids. The 15-horse-power traction engine is built with single speed attachment only.

DIRECTIONS FOR STARTING THE BIRDSALL TRACTION ENGINE.

To fill the boiler, unscrew the plug in the top of boiler at the rear of the smoke stack, and use the cast-iron funnel which is furnished with each engine. A little more than one gauge, or an inch of water in the glass is sufficient to fire up on.

As soon as the steam has raised sufficiently to show on the steam gauge, the steam blower may be used to increase the draft, and hasten the getting up steam.

While the steam is being gotten up, the piston rod and valve rod stuffing boxes, should be filled with packing; care should be taken in forcing in the stuffing box glands to keep the top and bottom sides forced in alike.



REAR VIEW OF ROAD ENGINE.

The throttle valve, blower valve, etc., should be packed before raising steam. Before starting the engine, see that all wearing surfaces are thoroughly lubricated with good oil. Grease or heavy oil is the best for the gearing, and must be used constantly, but good lard oil should be used on the wearing surfaces of the engine. A very small quantity of oil, if supplied *uniformly*, will be sufficient. To accomplish this, keep the brass wires, which will be found inside the glass oilers, screwed down so that the oil cannot feed fast enough to waste. If they should not supply oil fast enough to keep the bearings from heating, they can be made to feed faster by screwing the wires up.

Holes will be found in the hubs of the forward road wheels of the engine for the purpose of oiling them without removing them from the axle. The rear or traction wheels will need but very little oil, and the one on the right hand side of the engine needs none, as it is fastened to the axle and turns with it. The axle boxes should be oiled through the pipe in the center of the springs. A little cotton waste or wool placed in the cast-iron oil cups will make them feed more evenly and save oil.

Before starting the engine, be sure that the cylinder cocks are open, and if it has been standing for some time, it should be run with the gears out of mesh long enough to clear the cylinder of water, and to see that everything about the engine is in good working order. To make the engine run faster and *stronger*, screw *up* the thumb nut on speeder, which is connected to the governor valve stem, and screw it down to make engine run slower.

When ready to start the engine on the road, place the mitre gears next to the fly wheel box in mesh, and the reverse lever in the forward motion. To back the engine, shift the reverse lever to the back motion. When stopping the engine, if the reverse lever is set in the middle notch, that is, between its forward and back notches, before the throttle is entirely closed, the engine will not stop on its dead center.

To operate the injector, open the globe valve between it and the boiler wide, and regulate the supply of water by the globe valve in the suction.

A bar is provided with each engine, one-half inch thick by fourteen inches long, and tapered in the form of a wedge, which should be placed in the hole cast in the front axle support for boiler, in order to prevent the boiler from teetering upon the front axle spring when the engine is running. Keep all boxes as tight as they will run without heating, leave all drip cocks open in freezing weather, and clean the flues every day.

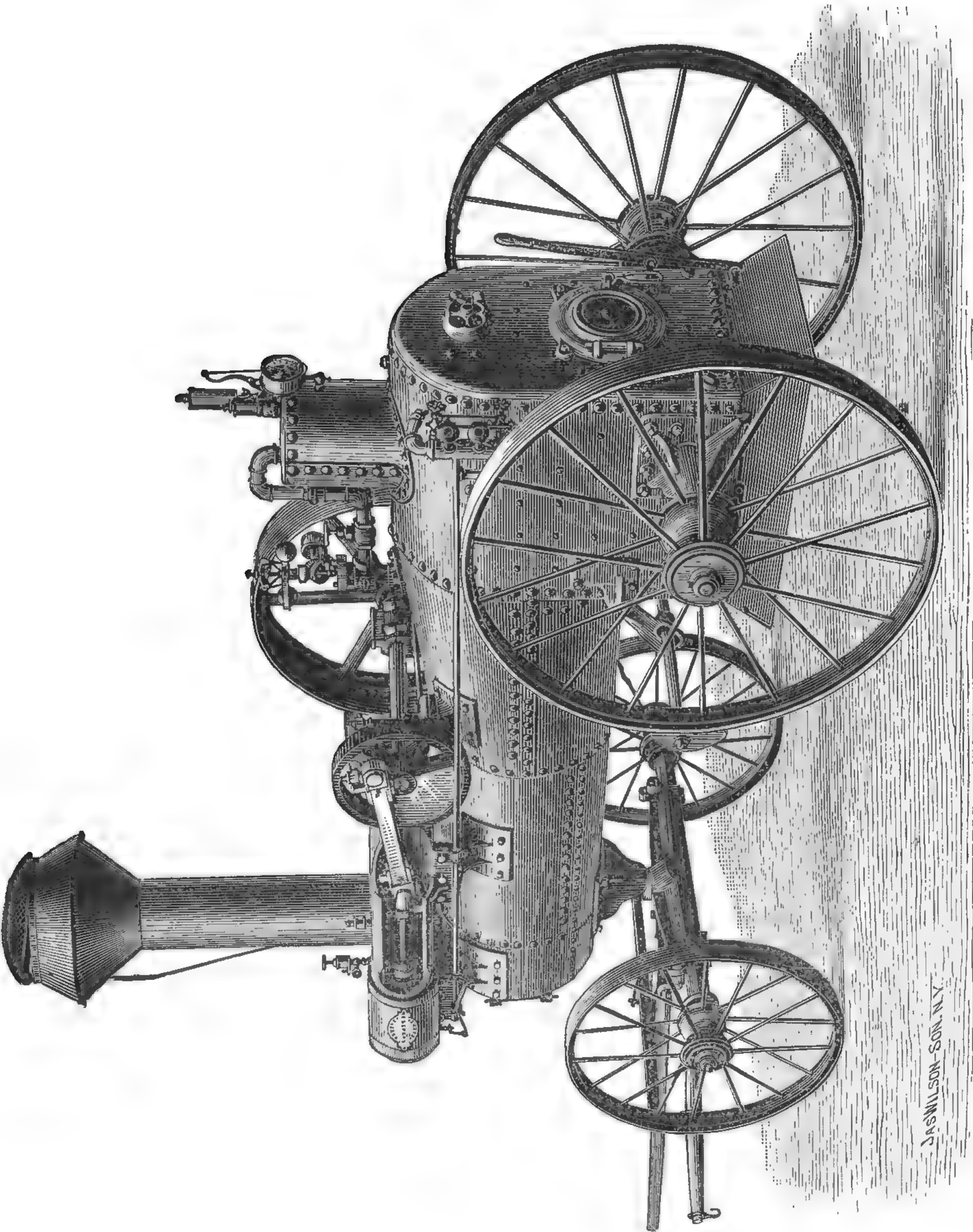
The front axle support can be oiled from either side of the flange casting where it is bolted to the boiler.

Always keep the tank clean, and use clean water if possible, and you will prevent burning out your boiler, and make the engine last much longer.

THE BIRDSALL PORTABLES.

6, 8, 10, 12 and 15 Horse Power.

By reference to the accompanying illustrations, it will be seen that with the exception of the traction attachments, our portable engines are similar in design and construction to the tractions, and consequently the foregoing description of boiler and working parts applies equally to either. In addition to these parts already explained, our portable engines are provided with a BRAKE, which is very simple in construction and extremely powerful, is attached to every engine mounted on trucks, and not only serves to control the load in going down hill, but firmly holds the engine from vibrating when at work. It is easily controlled from the driver's seat. The ROAD WHEELS are made of wrought iron throughout, with the exception of the hubs. These are provided with oil holes, so that the axles may be lubricated without removing the wheels from them, and taken all together they are universally acknowledged to be the neatest and most durable wheels manufactured. These engines are furnished with a pole, driver's spring seat, double and single-trees, wrenches, oil can, flue-cleaner and poker.



JAS WILSON-SON, N.Y.

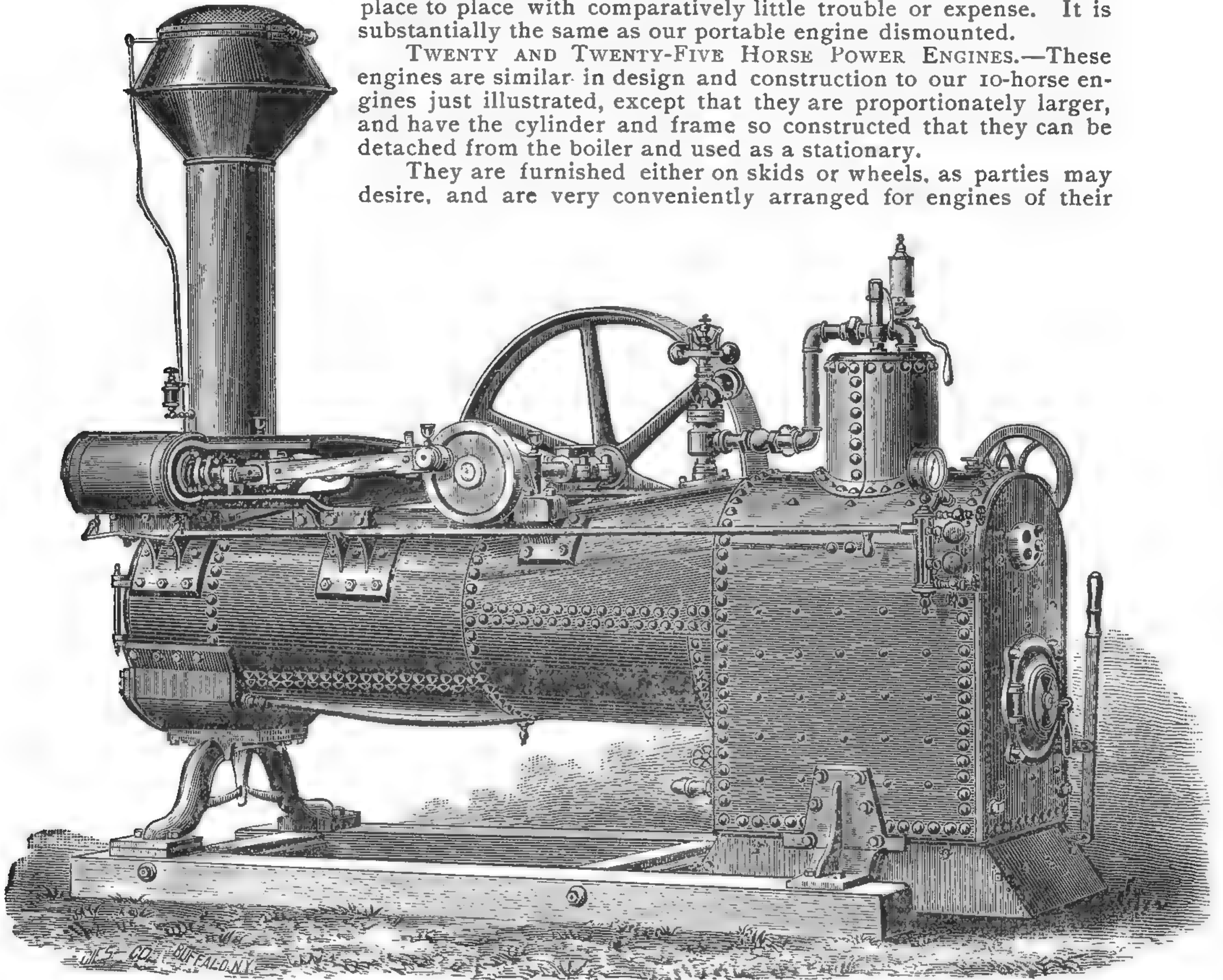
PORTABLE ENGINE.

SEMI-PORTABLE ENGINE.

The semi-portable engine is especially adapted to the ginning of cotton, running saw mills, feed mills, and such other machinery as requires a convenient and ready power. It can be used as a stationary engine, or it can be moved from place to place with comparatively little trouble or expense. It is substantially the same as our portable engine dismantled.

TWENTY AND TWENTY-FIVE HORSE POWER ENGINES.—These engines are similar in design and construction to our 10-horse engines just illustrated, except that they are proportionately larger, and have the cylinder and frame so constructed that they can be detached from the boiler and used as a stationary.

They are furnished either on skids or wheels, as parties may desire, and are very conveniently arranged for engines of their



The Birdsall Semi-Portable Engine, 6, 8, 10, 12 and 15-Horse Power

power. We also make the 20 and 25-horse engines and boilers with the engine attached to the skids under the boiler, instead of being mounted on the boiler, which brings the engine down low, where it is easy to oil and adjust, and is not affected by the expansion of the boiler. This makes a strong, substantial and convenient engine for saw mills and other stationary work. See illustration, page 15.

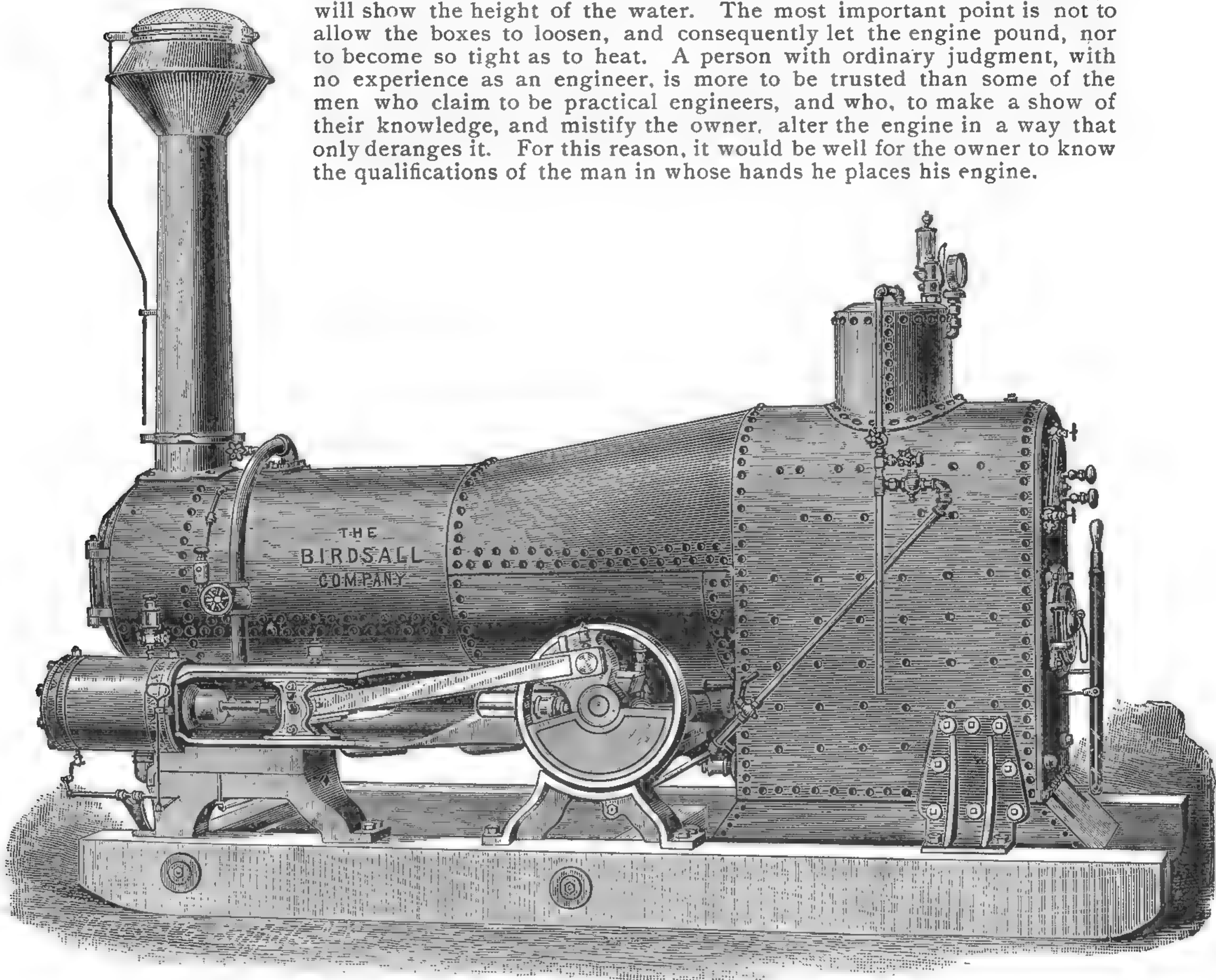
SMALLER SIZED ENGINES.—Our six and eight-horse engines, which we furnish either on skids or mounted on wheels, will be found admirably adapted to plantation and general farm purposes, such as threshing, sawing, ginning cotton, etc., etc.

Our eight-horse power engine is warranted to drive two 50-saw gins to their full capacity, or a 32-inch thresher, and has been used successfully in many localities to run the 36-inch cylinder, or steam size separator.

They possess the same general features as the larger engines, and are light, strong, economical and durable.

The reputation that our engines have already earned, in the many localities where they have been introduced throughout the United States, for economy of fuel and water, great strength, lightness, safety, superior workmanship, and general excellence of design and finish, is one which we may very justly feel proud of, and which in the future, as in the past, we shall put forth our best efforts to maintain.

We wish to caution the owners of engines against impostors, claiming to be old engineers. The owner is often misled by such men. Our engines are all tested by competent men, and every part is seen to be in perfect running order, before they leave our works. Water fire and oil are all that are necessary to start them. The steam-gauge will indicate the number of pounds of steam, and the water-gauge will show the height of the water. The most important point is not to allow the boxes to loosen, and consequently let the engine pound, nor to become so tight as to heat. A person with ordinary judgment, with no experience as an engineer, is more to be trusted than some of the men who claim to be practical engineers, and who, to make a show of their knowledge, and mistify the owner, alter the engine in a way that only deranges it. For this reason, it would be well for the owner to know the qualifications of the man in whose hands he places his engine.



The Birdsall Twenty and Twenty-five Horse-Power Semi-Portable Engine.

DIMENSIONS OF ENGINES.						DIMENSIONS OF BOILERS.							
Horse-Power.	CYLINDER.		BAL. WHEEL.		Revolutions per Minute.	Horse-power.	FIRE-BOX.			TUBES.			Diameter of Waist in Inches.
	Inches in Diameter.	Inches in Length.	Inches in Diameter.	Width of Face.			Width in Inches.	Length in Inches.	Height in Inches.	Number of.	Diameter in Inches.	Length in Inches.	
6	6	8	36	8 1/2	250	6	20	26	24	36	1 3/4	48	24
8	6 1/2	8	36	8 1/2	240	8	20	26	24	36	1 3/4	48	24
10	7	9	40	8 1/2	230	10	20	26	24	46	1 3/4	66	24
12	7 1/2	9	40	8 1/2	230	12	20	26	24	46	1 3/4	66	24
15	8	9	40	8 1/2	230	15	20	34	24	48	1 3/4	66	24
20	9	12	50	12	200	20	26	36	36	56	2	78	30
25	10	12	50	12	200	25	26	44	36	56	2	90	30

THE CAYUGA CHIEF SEPARATOR.

There is no class of machinery that is expected to do good work under such a variety of conditions and circumstances as a threshing machine. It must be capable of threshing long, tough wheat and rye without winding, and must thresh it clean from the straw; at the same time it must be capable of threshing barley and oats that oftentimes have very short straw which is so dry that it will break up fine, and the thresher must separate and clean it equally as well as the long, tough straw. It is also necessary that the machine should be simple and require but very little adjustment, as oftentimes it is run by incompetent men who are incapable of properly adjusting the machine. It has been our aim and study for the past ten years to perfect a separator that would as near as possible embrace all the above requirements; one that is strong and substantial, requiring very little adjustment, and adapted to all kinds and conditions of grain as near as may be. Our machines are no experiment and upon examination will be seen to embrace all of the old and well tried principles arranged by practical and skilled men, who have had a life-long experience with this class of machinery. When working up to its fullest capacity one part of the machine cannot crowd or overload another and cause the machine to clog or waste grain.

We will add here, that we have a neat and convenient bagger, that can be used on either side of the machine. This bagger has a register attached to it and registers the bags or measures as may be desired. This we are prepared to furnish when ordered, the price of which will be found in the price list.

Our claims of superiority on the separator are simplicity, durability, adaptability to all kinds and conditions of grain, small expense for repairs, good material and workmanship and excellent finish.

For the benefit of those who are not familiar with the construction of our separator, we append the following:

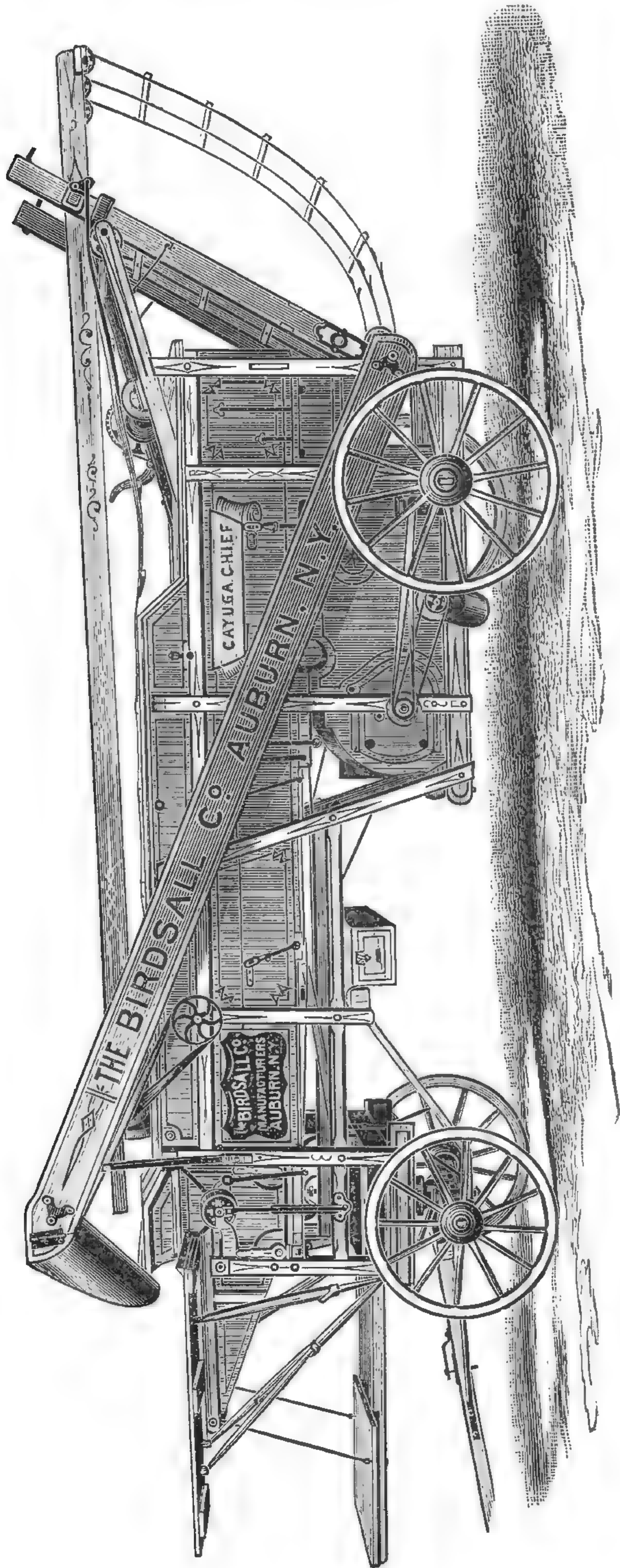
Description of the Cayuga Chief.

THE FRAME-WORK is made light, but of hard wood, and bolted and mortised together in the most secure manner. The frame is arranged and distributed in such a way as to resist to the best possible advantage the strains to which it is subjected, and the racking, incident to rapid moving, over rough and uneven roads. The top of the machine is well decked over and securely nailed, and the siding is put on to the posts with screws in as firm a manner as possible, the rear posts being carried above the machine to form a support for the windlass used in raising and lowering the stacker. The sills, which it will be noticed are large and strong, to enable them to sustain their large share of strains and load, are cut in two, and a truss, of such construction as to give the required amount of strength with the least weight is inserted, enabling the forward road wheels to be cramped short under the separator, thus allowing the machine to be turned around within its own length, a feature which every thresherman will appreciate.

THE TRUCKS are made in the best and most substantial manner, the wheels being fitted with large solid wooden hubs, with bent felloes, and good tires three inches wide and three-eighths inch thick.

THE POLE is made of sound tough timber and ironed in a convenient and substantial manner. When ordered, we can furnish a spliced pole, made in two sections, which can be used with either traction engines or horses.

THE CYLINDER and concave are nearly the same as used in our Apron Separators, and notwithstanding the frequent predictions of old threshermen that "they will not



CAYUGA CHIEF SEPARATOR.

work," they have been in successful operation for the past thirty years, and stand to-day without a rival for fast work, threshing clean from the head, and ease of draft. The cylinders are fitted with a steel shaft and four heads, the two end ones being solid, to which the bars are secured by four wrought-iron bands, tightly strunk on. After the cylinder is completed and the pulleys secured on the cylinder shaft in their proper places, the whole is given a perfect *running balance* at 1,500 revolutions per minute, which insures its running steady, and cool, and prevents its shaking the machine, even when running at its highest speed, and also prevents jumping out of its boxes and tearing around, "seeking whom it may devour." This is an improvement that cannot fail to be appreciated, especially by the feeder.

The cylinders are provided with 8 heavy beater bars, which are made heavier than those formerly used, and the holes for receiving the teeth are made perfectly round, true taper, and slotted in two places, which renders the shank of the tooth (already provided with a rib or feather, corresponding with the grooves in the bar) to be *permanently and securely* fastened, thus obviating their becoming loosened by use, and furnishes an opportunity to turn the tooth when it becomes worn, thus securing a double amount of wear.

The cylinder in our machine is made differently from that in any other machine, and so constructed as to thoroughly prevent any sticks or weeds or wet straw from collecting between the ends of the cylinder and cylinder cap, which often occurs in Western threshing, causing the machine not so made to run hard, and consequently, do bad work.

Our cylinder is so made that it can be adjusted endways by set screws at any moment, which prevents any endplay in the shaft, thus causing the teeth to track in the center between the concave teeth, and prevents the wheat being cut.

This end play in the cylinder in most machines is the great source of the trouble in cutting the wheat in threshing. The small number of teeth which we use in our cylinder are set in such a manner that it is impossible for any grain to pass between them without being threshed from the head, while at the same time it takes a great deal less power to operate it than it does where a greater number of teeth are used, besides making a great deal less chaff, which in turn makes easier separation, and less work for the mill, enabling the grain to be cleaned in the finest manner.

The concave is made in five sections, so that it, and the number of teeth, can be adapted to the different kinds and varying conditions of grain to be threshed, and is also adjustable by an entirely new device which provides for changing either the *front* or *back side*, as may be required. *It will be noticed that the back side only*, in many machines, is arranged for raising and lowering, whereas it is quite as important that the *front* or *throat* should be provided with some means by which it can be enlarged or diminished to suit the different kinds and conditions of grain.

The concave and cylinder are both held securely in their proper positions by iron side plates, which are firmly bolted to the frame of the machine.

The SEPARATING PARTS consists of two pans fitted with corrugated sheet iron bottoms, well painted, bottomed with tough wood, and strapped with hoop-iron, and all made as strong and light as possible, and constructed in such a manner that no litterings, chaff, grain or straw can escape over their sides. The vibratory motion is obtained from a double crank, driving two pitmans, one for each pan, with their motions in opposite directions, so that their vibrations just balance each other, causing them to work lightly and smoothly, and without shaking the machine.

In order to thresh and separate rapidly, the important fact should not be lost sight of that the operation of *threshing grain from the head thoroughly and completely separates it from the straw*, and that if it can be kept in this condition and conveyed to the mill, the main work that the separating appliances have to perform, will be comparatively easy, and will consist for the most part, in shaking out the grain that flies into the straw as it comes from the cylinder. In order to preserve and complete this separation, we use open concave sections, placing the first pan beneath them, while just behind them, on the bottom of the pan, are placed notched strips raised $3\frac{1}{2}$ inches from the corrugated

portion of the pan bottom, and eight inches from the other portion, and protected by wooden pieces $8\frac{1}{2}$ inches high, covered with sheet iron on the sides, with a piece of hoop-iron on top, which form the incline down which the straw passes from the cylinder. These strips are attached at the front end only and have a vibratory motion independent of the pan. The second pan is also provided with these strips, having the same vibratory motion, and in addition furnished with an adjustable knuckle joint, which admits of their being raised or lowered to retard or facilitate the passage of the straw.

These notched strips are forced into the straw at every vibration of the pan, and as the straw is being worked along toward the rear end of the machine, the notches in the strips being properly spaced, there is not half an inch of the entire mass of straw but that is opened out so as to give ample opportunity for the grain to fall by its own weight into the bottom of the pans, by which it is conveyed to the shoe. In the bottom of these pans are placed four sets of lifters or agitators, in the 36 and 32-inch machines, and three in the 28-inch machines, that toss or lift the straw as it is worked along over them in the same manner that a man would toss and shake it up by hand.

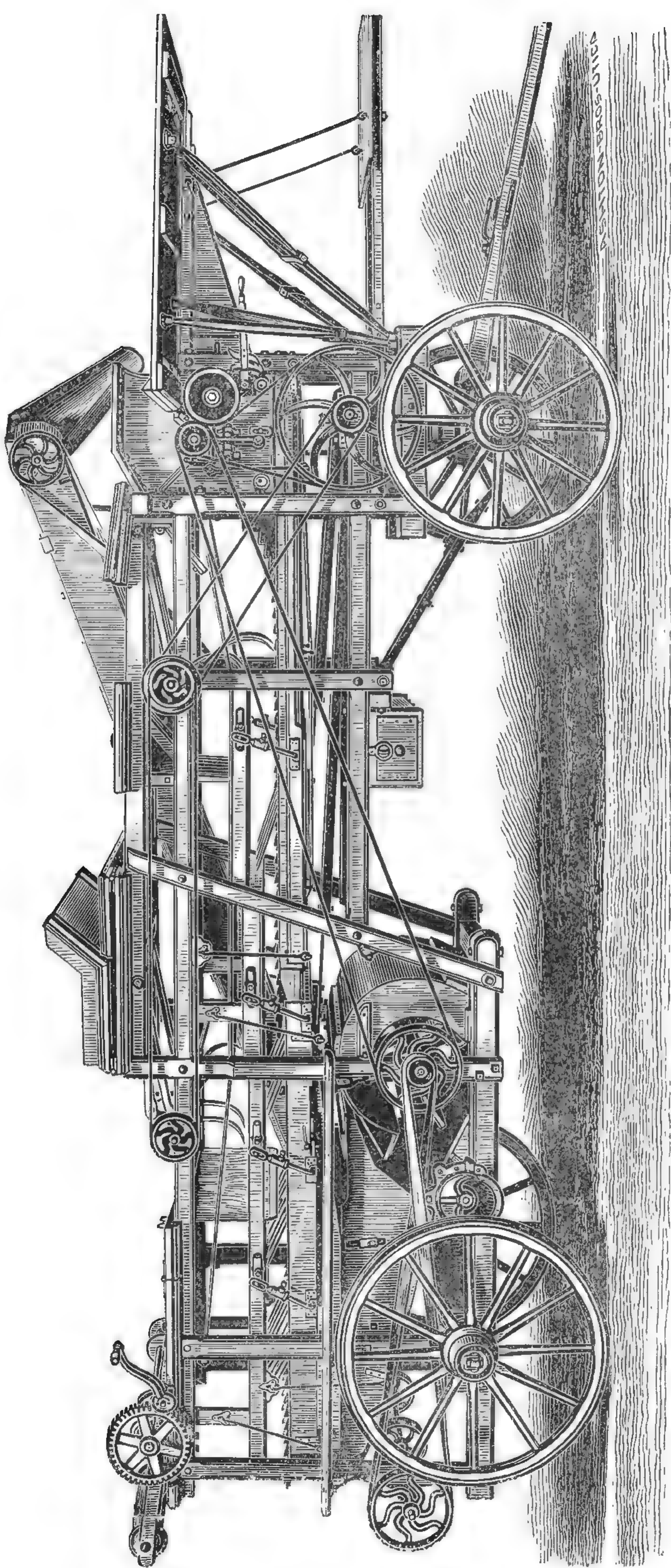
Just behind the cylinder is placed a beater, which thoroughly prevents any tendency of the straw to collect or wind on the cylinder and also prevents grain from flying back or landing on top of the straw, thus remedying a defect which is peculiar to most vibrating machines. Back of this beater is placed our patent kicker, which thoroughly shakes up the straw and assists largely in separation.

At the junction of the two pans is a second kicker like the one back of the cylinder. Behind the kicker is hung a canvass apron which stops the grain that may fly past the first curtain. These kickers prevent straw from passing out through the machine in bunches, and as they thoroughly pick up and keep the straw constantly in motion, it is almost impossible that any grain should pass through the machine in the straw.

CLEANING THE GRAIN.—In cleaning the grain we defy competition. Our shoe and riddles and the force and direction of the blast have been a long study with us, and we have attained as near perfection in this respect as can be obtained. Our machine widens out all the way from the cylinder back, thus increasing the separating and cleaning capacity of the machine, and also enabling us to use a shoe and riddles, one foot wider than the cylinder and of extra length, giving nearly double the cleaning capacity of other mills. As the grain and chaff are worked back to the shoe by the vibratory action of the pans, they are carried over a perforated galvanized iron distributor, peculiar to our machine, which is so constructed that while it allows the grain to readily pass through it, it thoroughly prevents the chaff, heads, and short straw from doing so. The riddles proper being entirely free from chaff and straw, have only the bare cleaning to perform, consequently they are able to do an unusually large amount of it, and are always free from liability of clogging.

THRESHING FLAX, TIMOTHY, ETC.—For the perfect handling of flax, timothy, barley, etc., there is no machine built that can excel the Cayuga Chief, a fact that is attested by threshermen and farmers throughout the country. It will thresh, beard, and clean barley at one operation, and deliver it ready for market, and as will be seen from an examination of the machine, the entire absence of revolving pickers and whippers, together with the special attachments which we furnish for the purpose, at a slight additional expense, making it the most desirable machine for handling flax, timothy, etc., in the market.

THE STRAW STACKERS in a great many threshing machines are sources of great annoyance, from their unwieldy construction, causing delay in raising them when beginning to work, and while the machine is running, and in lowering and securing in readiness for the road. The castings usually used for hinges, couplings, etc., are generally too light, which defect, in connection with the great weight and clumsiness, brings a large share of the breakages and profanity about the stacker. The stacker used on the Cayuga Chief is free from these defects, being very light and convenient to raise and lower, while being very strong and substantial, and having no cast hinges imperfectly fitted and liable to bind and break at any time. When on the road it lies on top of the machine occupying little space and firmly secured, thus throwing no undue weight on the hind wheels. A boy 12 years old can raise and lower it with perfect ease. It is furnished



SECTIONAL VIEW OF THE CAYUGA CHIEF SEPARATOR.

with canvass sides and curtains to prevent the wind from blowing off and scattering the straw. In every respect this is the most substantial and convenient stacker ever attached to the threshing machine. This stacker is also well adapted to use in connection with an independant stacker, which we are prepared to furnish when desired.

From the above description it will be seen that we manufacture an "A No. 1" machine, and warrant it to be durable and well made, of good materials, and when properly used, to give entire satisfaction.

It will be found upon examination, when taken as a whole, to be unlike any other machine made, one of its most prominent and commendable features being its simplicity, and will convince the most skeptical that its advantages are too apparent to allow room for even a doubt of its attaining the very best results when in operation. The only objection that has been brought against our machine is the one of which we boast, viz.: its simplicity. We have endeavored to relieve it of every unnecessary complication; so doing we are able to produce a machine that is durable, light to move about, with less belts, journals, shafts, and wearing parts, consequently requiring less attention, bother, expense and power to operate it; while at the same time it is so constructed that it is not affected by adverse winds and does not cause litterings, is very quick and handy to move, and is furnished with straw stackers of the most approved design, and of ample capacity to take care of all straw the machine can get to them.

POINTS OF EXCELLENCE OF THE CAYUGA CHIEF.—The cylinder and concaves are so arranged that dust and hard substances are not thrown in the face of the feeder, and with the steel shaft, heavy bars and heads, perfect running balance, strong teeth, and sectional concaves, with ready means for adjustment, it makes the best cylinder and concave arrangement in existence for threshing fast and clean from the head, while the number of teeth used causes the cylinder to take less power, and makes less chaff, which in turn makes easier and more perfect separation, and less work for the shoe and riddles, and this in turn saves the expense of an extra hand with a stick to keep them clean.

IT HAS THRESHING CAPACITY sufficient for all the straw that any set of men can handle to it.

SEPARATING CAPACITY sufficient to separate perfectly and without wastage all the grain that can be fed into the cylinder.

CLEANING CAPACITY sufficient to clean perfectly all the grain that comes to the sieves, together with durability, simplicity, ease of draft, convenience, absence of detention, impossibility of "clogging" in any kind of grain, adaptation to all kinds of grain, and, in a word, all the necessary "working qualities" that make up the *best and most profitable machine*.

In offering this machine to the trade we can assure you that its record has been a brilliant one, at the same time fully realizing that such rapid progress in the experience and knowledge of threshermen as to the requirements of the best threshing machinery demands of every manufacturer who expects to succeed the most untiring energy and watchfulness, to produce machinery which shall be recognized as "standard goods."

We are fully aware of these facts, are fortified by years of experience, and possessed of every facility to do well whatever we undertake, and it does not seem presumptuous for us to ask all who contemplate buying, and who wish to purchase the best, to rely upon our statements and buy the Cayuga Chief.

DIMENSIONS OF THE CAYUGA CHIEF.

28 inch by 44 inch. Size for Six to Eight Horse-Power Engine.

Weight of Cylinder.....	235	lbs.
Length of Cylinder.....	28	inches.
Diameter of Cylinder.....	17	inches.
Number of Teeth.....	48	
Number of Revolutions per minute.....	1400	
Number or Teeth in Concave.....	43	
Width of Separator under Cylinder.....	32	inches.
Width of Separator under discharge end.....	44	inches.
Depth of Separator at Cylinder end.....	27 ¹ / ₂	inches.
Depth of Separator at discharge end.....	24	inches.
Length of Separator.....	14	feet.
Size of Riddles.....	35x50	inches.

32 inch by 48 inch. Size for Six or Eight Horse-Power Engine.

Weight of Cylinder.....	260	lbs.
Length of Cylinder.....	32	inches.
Diameter of Cylinder.....	17	inches.
Number of Teeth.....	52	
Number of Revolutions per minute.....	1400	
Number of Teeth in Concave.....	68	
Width of Separator under Cylinder.....	3	feet.
Width of Separator at discharge end.....	4	feet.
Depth of Separator at Cylinder end.....	27 ¹ / ₂	inches.
Depth of Separator at discharge end.....	24	inches.
Length of Separator.....	16	feet.
Size of Riddles.....	40x50	inches.

36 inch by 52 inch. Size for Ten to Twelve Horse-Power Engine.

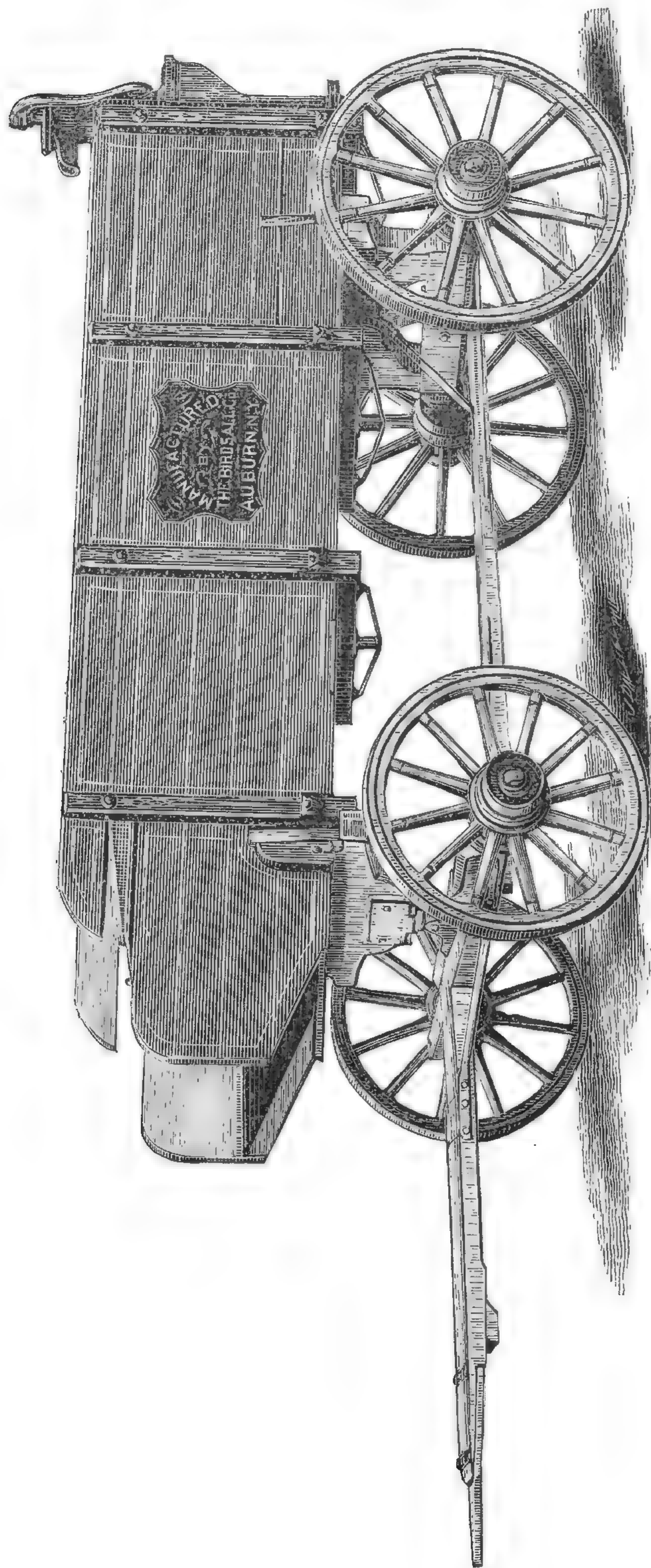
Weight of Cylinder.....	290	lbs.
Length of Cylinder.....	36	inches.
Diameter of Cylinder.....	17	inches.
Number of Teeth.....	60	
Number of Revolutions per minute.....	1400	
Number of Teeth in Concave.....	80	
Width of Separator under Cylinder.....	40	inches.
Width of Separator at discharge end.....	52	inches.
Depth of Separator at Cylinder end.....	27 ¹ / ₂	inches.
Depth of Separator at discharge end.....	24	inches.
Length of Separator.....	16	feet.
Size of Riddles.....	44x50	inches.

OUR WATER WAGON.

The cut on page 23 represents the very convenient and durable tank which we build to be used with traction engines, and which will be found very well adapted to the wants of threshermen, or others needing a wagon to haul water. The tank will hold about eight barrels of water. It is made of pine, thoroughly painted and put together in the best manner to secure tightness and durability. It is provided with a coal box, a serviceable pump, and suction hose. The top can be used to carry the various tools which are needed. The wheels are very strong, are built with wooden hubs and are as good as the wheels used on the best farm wagons. The front wheels cut under the tank box, which is very convenient in turning in a small space. The trucks will be found very useful for many purposes when the box is removed.

The pole is in two pieces, fastened together in a very convenient and simple manner for use either with a traction engine or horses.

The painting and general finish of this tank is first class in every respect. We have endeavored in designing and building it to produce something which will be worthy a place alongside our traction engine and vibrating separator, and which will add to the usefulness of our machinery.



THE BIRDSALL WATER WAGON.

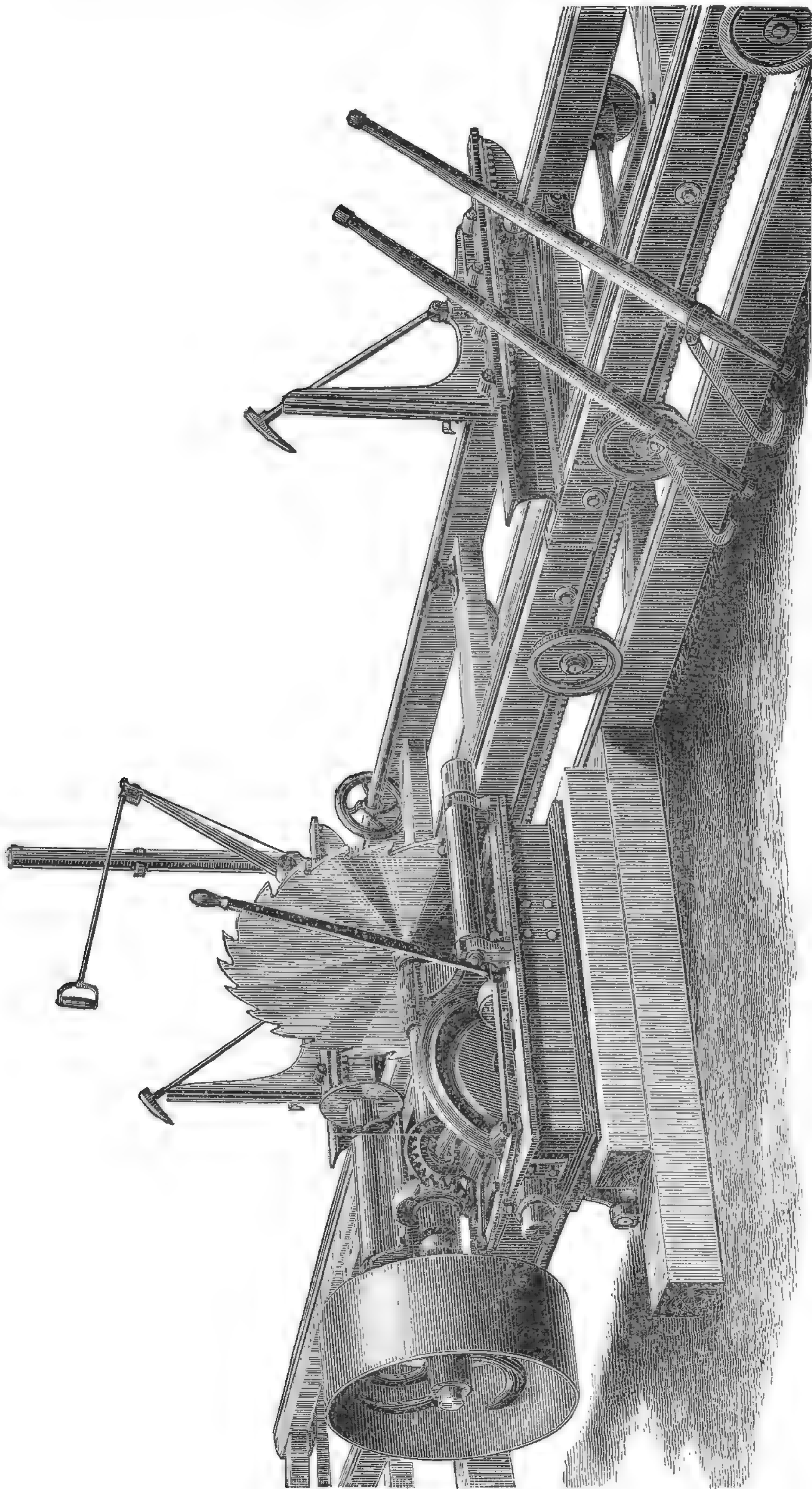
THE PATENT VARIABLE FRICTION FEED CIRCULAR SAW MILL, No. 1.

The cut on page 25 represents our latest Improved Patent Variable Friction Feed Circular Saw Mill, which we confidently recommend as being superior to any mill made in the United States for a small or medium lumbering business, and where it will not pay to use steam feed stationary mills. The artist has made the illustration so plain that an explanation of the mill is hardly necessary.

The husk frame is of iron and is cast in one solid piece. It is much stronger and heavier than is generally used for this class of saw mills, and is superior to any wood frame, because it is more rigid, is not injured by being exposed to the weather; the working parts are not so liable to get out of line, and it will look as good as new after years of use. The mandrel of this mill is made of a special quality of steel for this purpose, and is very strong and heavy, being three inches in diameter, enabling it to stand the work of fifty-horse power. It runs in very wide, self-oiling bearings which are lined with the best anti-friction metal. The end motion of the mandrel is regulated by a collar on the mandrel at the bearing furthest from the saw, and the saw collar at saw end of mandrel is not allowed to touch the bearing. This feature in our mills will be appreciated by all experienced sawyers, who have had trouble with heated saw collars, as it effectually prevents all heating at the saw collar end of mandrel. No saw will run properly on a mandrel that runs at all warm, because the heat expands the centre of the saw, making it concave and out of line with the carriage. The saw guide can be adjusted while the saw is in motion. It is a very simple and solid device.

The feeding device on this mill is original with us, and is used only on our mills. It is the only arrangement of the kind in use that does not crowd the mandrel endways, causing it to heat. It consists of a disc, keyed fast to a shaft that is connected at right angles with the saw mandrel by a bevel gear that works easily, smoothly and positively, and the motion is transmitted to the carriage by friction wheels, arranged to be brought in contact with the face of the disc, and so arranged that the friction wheel can be shifted towards the centre of the disc when a slow feed is required, or from the centre when a faster feed is desirable, the different feeds from slow to fast being produced by sliding the face of the disc from centre to circumference, or *visa versa* across the friction wheel. The sawyer has perfect control of the feed at all times, and can change it instantly to slow or fast while the saw is in the cut, without stopping or making any change whatever, except a movement of his lever. By use of this device the sawyer can always use all the power of his engine whenever in a light or heavy cut. The feed is variable from nothing up to four inches to each revolution of the saw, and thus is adapted to any size or power. They can be run successfully by an engine as small as eight horse-power, are equally well adapted to engines of forty or fifty horse capacity, and a greater amount of work can be done with these mills with the same size engine, whether large or small, and same amount of help, than any other portable saw mills. This mill has no belts whatever; is always ready; has no complicated parts, and is very compact, solid, simple and convenient.

The carriage is made strong and solid, and is held together with screw bolts extending through both sides, making it strong and rigid. It is mounted on solid iron flanged rollers ten inches in diameter; they are connected by heavy wrought-iron axles that extend across the carriage, and run in self-oiling bearings; they are capable of supporting the carriage and the heaviest timber without trembling, and the trucks being large in diameter, less power is required to move the carriage than in the ordinary mills on the market. The standard length of carriage is 24 feet, with 32 feet of feed rack, so that the mill will saw logs about 30 feet in length. The track is wrought-iron, and scrapers are provided on the carriage for keeping the track clean of saw dust, bark, etc. The head blocks are solid iron, heavy, and open wide to take on the largest logs. They are



THE PATENT VARIABLE FRICTION FEED CIRCULAR SAW MILL.

nicely fitted up. Standards are high and solid. Chisel dogs are provided for holding the last board. The head blocks are simultaneous and very accurate: are lever setting and so arranged that the sawyer can set the log without leaving his position at the lever that controls the movement of the carriage. The position of the sawyer on front side of the carriage enables him to handle the logs with ease and determine the proper set in slabbing at a glance,

In addition to the carriage described above we build one twenty-four feet long with a log beam sixteen feet long, with headblocks at the extreme ends. This log beam is eighteen inches wide and four inches thick, and is supported by rests three feet apart, and on a level with the headblocks, thus making a support for the log every three feet. Attached to the log beam above each rest is a log knee with dogs for securing the log, so that any length from three to thirty feet can be sawed without changing the head blocks. The head blocks are the same as in the carriage, above described.

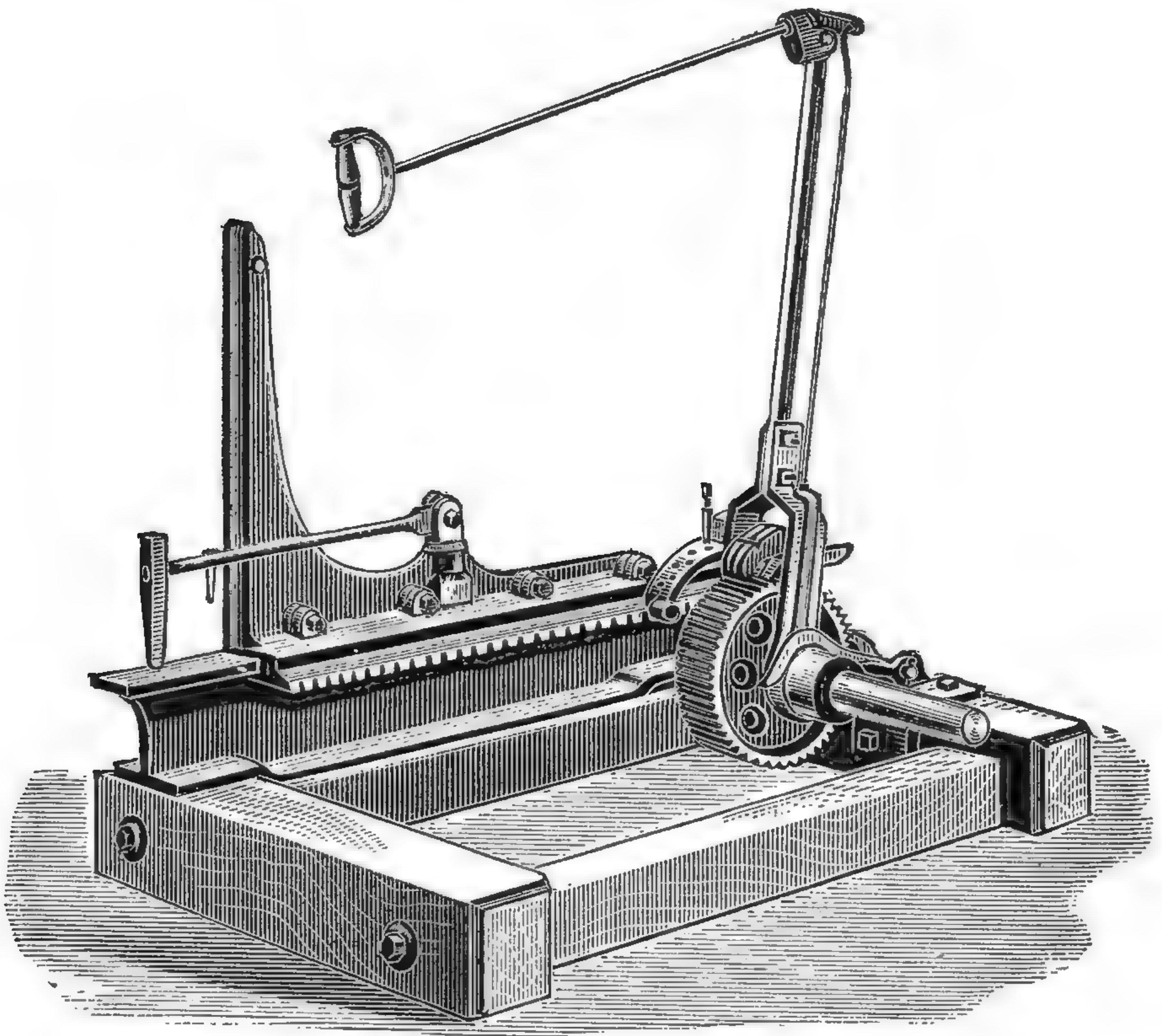
Attached to this log beam are three screws for holding the last board at the bottom to keep it from springing. This makes a very convenient carriage for stationary work.

In the mill represented above we believe we have approached nearer perfection in the feed device than has ever been attained by any Saw Mill manufacturers, in that the Mill without any change whatever can be driven by a smaller engine than is required to drive any other mill in use, and at the same time it is better adapted for use with large size engines than other mills, owing to the ability of the sawyer to ease or favor the saw in cutting through large knots or tough butt cuts, and to instantly change from the slowest to the fastest feed when required without losing any time. There are so many points of excellence and merit embodied in the Mill—which any practical sawyer and lumberman will notice—that it is unnecessary for us to name them, and we trust that anyone contemplating purchasing a Saw Mill or Engine will examine ours and get our prices and terms before ordering.

OUR NO. 2 VARIABLE FRICTION FEED CIRCULAR SAW MILL.

The demand for a light mill that can be sold for less money than our standard No. 1 Mill has induced us to place on the market this No. 2 Mill, which possess all the important features of the larger mill, but is lighter and more easily moved from place to place. The husk frame is made of wood, and is put together in a solid and substantial manner. The mandrel is $2\frac{5}{8}$ inches in diameter, and is made of a special quality of steel rolled for that purpose and runs in long, self-oiling boxes, lined with the best anti-friction metal. The collar on the mandrel to take up end-play is on the opposite end from the saw, thus preventing any tendency to heat. The feeding device is similar to that described in our No. 1 Mill. This mill has no belts whatever, is always ready, no complicated parts, very compact, solid, simple and convenient.

The standard length of carriage is 18 feet, and will saw 24 feet in length. The track is of wrought iron, and scrapers are provided on the carriage for keeping the track free from saw dust, ice, etc. The trucks of the carriage are larger than those used on most mills of this size, thus causing the carriage to run easily. The head blocks are solid iron and nicely finished, and open thirty inches. The setting arrangement is a new device and is very strong, substantial, and not liable to get out of order, and will set accurately. The dogs are similar to those on the No. 1 Mill. The largest saw this mill will carry is 54 inches in diameter. We have endeavored to construct this mill so that it will do as good work and as accurate work as the larger mill, but it is not intended for as heavy work. It is adapted to horse-power ranging from ten to twenty. Those contemplating purchasing a saw mill are earnestly requested to look into the merits of our mills before placing their orders elsewhere. We call your attention to the cut on page 27, illustrating our new set works. The same design is used on both mills.



SET WORKS.

There has been a demand among our customers for a set that would better stand the work of setting heavy logs, as logs are often placed on mills of this class heavier than the mill is intended to carry. For this reason we have constructed the set works illustrated above. You will notice that all the dogs are operated by one lever, which is also used to set the logs. There are seven dogs on the set side with a slight variation in the length of each, therefore, one is always in place at whatever point the lever is set. On the back side are three dogs, used for running the head blocks back, under these are seven more dogs, similar to those in front. These dogs are used to hold the head blocks at any point desired, and are thrown out simultaneously with the feed dogs when desired and the same motion of the lever throws in the reversing dogs. This set is attached to a piece of shaft two feet long, which is connected to the long set shaft by a flange coupling with slotted holes, which permits of easy adjustment of the head blocks.

TESTIMONIALS.

The Birdsall Co., Baltimore, Md.:

FAIRLEE, MD., Dec. 8th, 1891.

DEAR SIR:—I have used quite a number of different makes of engines, but I must say I consider The Birdsall the best I ever used. It uses less fuel and water than any engine I ever handled. Soft ground has no effect on it whatever. It will move right along while others are standing almost on end, puffing and settling in the mud. It is just the engine I have been looking for. I never yet had to block it when in use to make it stand steady. I have threshed more wheat and corn this year than ever before, and have yet to hear the first complaint. I would advise all who are in need of an engine to buy no other than the Birdsall. One man for whom I threshed always said the — engine was his engine, and he thought he would buy one another year, but before I had finished his job he changed his mind, and now joins with me in saying the Birdsall is the best out yet. In conclusion I have to add that it is the most perfect engine I have ever used, and I have been using engines for almost twenty years. Success to the Birdsall machinery.

Very truly yours,

WALTER SPARKS.

The Birdsall Co., Baltimore, Md.:

OELLA, BALTIMORE CO., MD., Jan. 10th, 1892.

GENTLEMEN:—Regarding the traction engine I bought of you this past season, I can say it is as good a puller as ever went on the road, and it takes less fuel and less water than any engine I ever saw. I threshed 650 bushels of wheat with four and one-half bushels of coal and three barrels of water. It has the best wheel under an engine that I ever saw. I have pulled over the worst roads in Frederick county without getting stalled. I also own a solid-faced wheel traction engine, but your engine handles a great deal easier. I pulled up a hill the other day where the snow was eight inches deep. If I was a betting man, I would not be afraid to bet one hundred dollars that there is no solid-wheel engine in existence that would have climbed it.

Yours truly,

WM. H. DAYHOOF.

The Birdsall Co., Auburn, N. Y.:

SKYESVILLE, CARROLL CO., MD., Oct. 19th, 1891.

GENTLEMEN:—The twelve-horse traction engine and thirty-two inch vibrator thresher I bought through your Baltimore house, has given entire satisfaction. I have run several makes of engines, but the "Birdsall" carries the banner. I couple up to my thresher, Reeves Stacker and water wagon, and have had no trouble in climbing any hill that has come in my way, and when I open the throttle the road belongs to it. I have named my engine "Sullivan" because it is hard to knock out. I would recommend the Birdsall machinery to all who want first-class goods.

Very truly yours,

B. H. AMOS.

We, the undersigned farmers of Howard county, Md., had our grain threshed by B. H. Amos, with the Birdsall outfit, and we must say that we never had a threshing rig on our farms that did equal or more satisfactory work. The engine used but little coal and water, and gave ample power for driving the thresher to its full capacity, and the machine did extra clean and rapid work.

Dr. J. W. Hebb, Thos. W. Ridgley, Post Office, West Friendship: Jos. Silby, Clarkson: Clinton Barlow, Samuel T. Slack, Benj. F. Hess, Jno. Slack, Sucksville.

The Birdsall Co., Baltimore, Md.:

CHESTERVILLE, MD., Jan. 7th, 1892.

GENTLEMEN:—The traction engine I bought of you last year has given me entire satisfaction. I find it easy to fire, and it is economical in the use of fuel and water. The advantage of the open-faced traction wheel, I think, is a great one, as it will travel over roads where an engine provided with the solid-faced wheel will stand still. I honestly believe it to be the best traction engine on the market.

Very truly yours,

S. M. FORD.

The Birdsall Co., Auburn, N. Y.:

NEW LONDON, PA., Jan. 5th, 1892.

GENTLEMEN:—In reply to your letter of 2nd inst., would say: The traction engine I bought of you last July gives satisfaction, and I would cheerfully recommend it to all those who wish to buy an engine that is easily managed and will haul its load where most road engines fail.

Very truly yours,

GEO. F. GILLESPIE.

The Birdsall Co., Auburn, N. Y.:

ST. NICHOLAS, TALBOT CO., MD., Jan. 7th, 1892.

GENTLEMEN:—The engine I bought of you last season gives entire satisfaction. It was late in the season before I bought it, consequently used it but a little, but what I have seen of it, there is no question about it giving satisfaction. If I should get another engine, I would most certainly get one just like it. The steering gear is the finest I ever saw, and the driving wheels most decidedly so. In fact, the general make-up of the engine I consider the best on the market.

Very truly yours,

SAMUEL A. HARPER.

The Birdsall Co., Auburn, N. Y.:

PRINCE FREDERICK, MD., Jan. 10th, 1892.

GENTLEMEN:—The traction engine and vibrator we bought of you last June gives entire satisfaction in every particular to both the farmers and the owners. The thresher is the best machine that ever come into this country, and leaves no grain in the straw. I traveled with the engine hitched on to the thresher, seven miles, over sandy and hilly roads, and threshed 978 bushels of wheat and left the same day for the next farm. The engine is a good steamer and uses less fuel than any engine I ever saw.

Very truly yours,

WM. H. ROBINSON & CO.

The Birdsall Co., St. Louis, Mo.:

NEW CAMBRIA, MO., Jan. 7th, 1892.

GENTLEMEN:—I take pleasure in speaking a word for the "Birdsall" machinery. The traction engine is the best I ever saw, and will pull more and take less fuel and water, and is easier moved than any traction engine I ever saw, or ever was in this country. It has the best drive wheel ever put on an engine, and nobody can deny it. It is the best arranged traction I ever saw, and will go up and down hill without any priming or danger of the water getting off the crown sheet. I have pulled my thirty-six inch separator and water tank up steep hills right after a rain, where it will take six good horses to pull up the separator alone. Everybody who sees the engine says it is the best they ever saw. The machine does first class work, and is the best cleaner in any grain that was ever used in this section. The saw mill is a daisy. The friction feed just beats anything there is in the market, and everybody says of the mill what they do of the engine, that it is the best they ever saw run. I am sawing with a twelve-horse Birdsall traction, and driving a fifty-four inch saw, and cut easily 3,000 feet of hard wood lumber in ten hours, with three hands. I have been running engines and saw mills for fifteen years, and can say that the Birdsall engine and saw mill have no equal in this part of the country.

Very truly yours,

D. D. KNIGHT.

The Birdsall Co., Baltimore, Md. :

TRAPPE, MD., Jan. 6th, 1892.

GENTLEMEN:—It gives me pleasure to recommend the Birdsall engine. I have run it the past season, threshing with a thirty-six inch vibrator machine and a stacker, and it has plenty of power. I think it has no equal for road work. It is very simple and easy to manage. I used it this fall hauling seven tons to a load, over a road where I have seen many times, other makes of engines stall with only a threshing machine to pull. The suspended tank is a very great convenience. There are many points of merit about your engine that any one will appreciate that uses an engine for farm work.

Very truly yours,

WM. H. MERRICK.

The Birdsall Co., St. Louis, Mo. :

ASH GROVE, Mo., Sept. 11th, 1891.

GENTLEMEN:—This season we bought one of your Cayuga Chief separators, and must say that it gives us better satisfaction than we expected, although, this is the second Birdsall separator we have owned. We have had all we could do since very early in the season, and not one of our customers has complained; no difference what we were threshing, all are perfectly satisfied, and so are we.

Very truly yours,

H. T. MOORE & J. H. STEWART.

The Birdsall Co., St. Louis, Mo. :

ASH GROVE, Mo., Sept. 11th, 1891.

GENTLEMEN:—The Cayuga Chief separator we bought of you this season, has done first-class work in all respects, and has given both ourselves and our customers satisfaction in all kinds of grain.

Yours truly,

E. M. CHILCUTT & J. P. MOORE.

The Birdsall Co., St. Louis, Mo. :

PONTIAC, LIVINGSTON CO., ILL., Dec. 20th, 1891.

GENTLEMEN:—I have used your threshing outfit for the past twelve years, and I am satisfied that it is the best threshing outfit that there is in the market. I have threshed more wheat in a day than any other machine in this (Livingston) county. None of the other threshers would try to compete with it after seeing it work. I can thresh one thousand bushels of wheat with five hundred pounds of coal, where other machines use from a ton to a ton and a half, and then not thresh over six or seven hundred bushels in a day. To any one intending to buy a threshing outfit, I would simply add to get the "Birdsall" and take no other.

Very truly yours,

WM. LOWER.

The Birdsall Co., St. Louis, Mo. :

MONROE CITY, Mo., Nov. 19th, 1891.

GENTLEMEN:—The twelve-horse engine I purchased from your house this year, has given entire satisfaction, and my customers are well pleased with its work. I have pulled up hills where others failed, and I can truly say to those intending to purchase an engine, that they can buy none that will excel the "Birdsall."

Yours truly,

CECIL DAWSON.

P. S.—I would also add that the Variable Friction Feed saw mill which we purchased from you, cannot be excelled.

DAWSON & MYERS.

The Birdsall Co., St. Louis, Mo. :

DELANEY, ARK., Jan. 1st, 1892.

GENTLEMEN:—In regard to the little mill we bought of you, would say that she is a "little daisy." We have sawed one set of walnut and I never saw a machine that worked nicer or gave better satisfaction than our little mill. I have owned and run a great many mills, and can safely say that the twenty-horse-power boiler and engine and saw mill, altogether, is the best rig I ever saw. Your Variable Friction Feed beats all the feeds I ever used; in fact, the entire outfit is a perfect success, and if I wanted another, I could not be coaxed to buy any other than the Birdsall. I have a first-class engineer, and he says he never handled a better machine, or any that worked as nice. He has been employed at the Joplin mines fourteen years, and has handled a great many engines. We have sawed one setting and never warmed a box, broke a bolt, or anything else. Give me the Birdsall saw mill outfit before any other. I remain,

Very truly yours,

J. S. FRETZ.

The Birdsall Co., St. Louis, Mo. :

SPRINGFIELD, Mo., Oct. 22nd, 1891.

GENTLEMEN:—This year I bought one of your 12-horse power traction engines with suspended tank and a Cayuga Chief separator of your local agents, Mills & Co., here, and have run the outfit the whole season through with only \$2.00 expense. I threshed 30,000 bushels of wheat and 7,000 bushels of oats and have not had a complaint from any of my customers, and I am perfectly satisfied with both engine and separator. The country where I worked was very rough, hilly and rocky. I have never yet found a hill I could not pull up. The engine uses but very little fuel and water and steams easily. I used wood only and never had a particle of trouble to keep up steam. Your machine does perfect and fast work in both wheat and oats.

Very truly yours,

T. C. GALBRAITH.

The Birdsall Co., St. Louis, Mo. :

HAWKINGS, Mo., Nov. 26th, 1891.

GENTLEMEN:—As I promised your agent to write at the end of the season and tell how I liked the Birdsall outfit, will say: The 12-horse traction I bought of you last spring is all you claimed for it. I have gone this year where no other traction engine ever went before, and pulled my separator after me, and never left it behind on any hill, nor in any mud hole. I always went up and out without any trouble. As to the water tank under the boiler, I consider it the best out yet. I have done over \$1,200 worth of work with my engine this past summer, and the oil bill is all the expense I have had. It runs smoother, fires easier and takes less water and fuel than any engine I ever run.

Yours truly,

S. B. FREEMAN.

The Birdsall Co., St. Louis, Mo. :

PAWNEE, BOURBON CO., KANSAS, Nov. 11th, 1891.

GENTLEMEN:—The Birdsall engine and separator I bought of you this year has given both myself and customers perfect satisfaction in every respect. The engine will travel in mud where no other engine will go, owing to your patent open-faced driving wheels, and also to the more than usual power furnished by your engine over 12 horse engines of other makes. It uses less fuel and water than any other engine, and I have not had a dollar's worth of repairs or an hour's delay all summer. The separator is the best on earth in all grains, and can do more and better work in flax than any machine I ever saw, and I have been threshing every season for 25 years. Everybody says that when I thresh flax, I do it faster and better and come nearer getting all of it in the half bushel than any other machine. I can easily thresh from 400 to 500 bushels of flax in a day, and I defy anybody to do as much and as good work as I can do with the Birdsall outfit.

Very truly yours,

AMOS DUNN.

The Birdsall Co., St. Louis, Mo. :

LIBERTY, KAN., Aug. 4th, 1891.

GENTLEMEN:—I am perfectly satisfied with the twelve-horse-power engine and thirty-six-inch separator I bought of you. It does perfect work in wheat and oats, which is all I have threshed thus far.

Very truly yours,

WM. M. BONNER

LIBERTY, KAN., Aug. 1891.

Mr. Wm. Booner started his Birdsall engine and separator on my farm, and I can truthfully say to you that his outfit started without any delay, and he has done me the best work in both wheat and oats that I ever had done. I have been a farmer all my life and have lived in this county thirteen years. It started off smoother and slicker than any machine I ever saw, and it gave perfect satisfaction to all my neighbors who had assembled to witness it start. The engine uses less fuel and water than any engine I ever had on my farm.

Yours truly, S. G. ESTES.

Liberty Township, Montgomery Co., Kan.

LIBERTY, MONTGOMERY CO., KAN.

On the farm of Mr. Samuel G. Estes, we, the undersigned, have witnessed the starting of the Birdsall outfit, bought by Mr. Wm. M. Bonner from you, and wish to testify that so far he has done perfect work in both wheat and oats, and did it from the very start. Both the engine and separator stand still when working, without bracing, blocking, or clamps of any kind. All he has to do is to get in line and he is ready for work.

M. Estes, James S. Lynn, F. M. Mans, Joseph Thompson, A. C. Wilkins, L. Earl, G. H. Fritts, and J. P. Sherman.

The Birdsall Co., Auburn, N. Y.:

SAMANTHA, OHIO, Jan. 1st. 1892.

GENTLEMEN:—The Cayuga Chief thrasher purchased of you we like very much, and do not think it can be beaten. We have done a good season's work and have left all our customers satisfied and well pleased, and had twice as many calls as we could attend to at that. We have run seven different makes of machines but the Birdsall is far ahead of any of them.

Very truly yours, STEVENS & WRIGHT.

To whom it may concern:

OFFICE OF ADAM KINLEY, TANNER OF UNION BACKS.

BREMSPORT, CHEMUNG CO., July 5th, 1890.

McDougall Brothers & Smith have drawn bark to my tannery with a Birdsall traction engine, and they draw up a very heavy grade and haul from 8½ to 9½ tons of bark to a trip, besides drawing a tank of water, which will weigh 2½ tons more. Said engine will handle these loads of bark over my yard that is graded with tan bark, and which is very soft, owing to the late heavy rains, and handle the loads with perfect ease.

Signed, ADAM KINLEY & CHARLES H. KINLEY.

The Birdsall Co., Auburn, N. Y.:

HUDSON, IND., Dec. 28th. 1890.

GENTLEMEN:—Having had twenty years experience in threshing, handling at least six different makes of machines, we think we understand what is a good machine, and can truly say the Birdsall is the best we ever used. Old farmers say they never saw the like. It is easy to operate, makes the least noise when running, and does more work than any of the other machines of like capacity. The engine is a dandy. We can move over roads where the engines provided with solid wheels can't and more, will not undertake to move. We can't say too much in favor of the Birdsall.

A. J. SHATTO & PHILIP HIGH.

The Birdsall Co., Baltimore, Md.:

TRAPPE, MD., Dec. 8th, 1890.

GENTLEMEN:—Having used one of your traction engines this last fall, baling hay and straw, I am bound to say that it is first-class and gives me entire satisfaction.

B. W. COOK.

The Birdsall Co., Baltimore, Md.:

CHURCHVILLE, MD., Dec. 23d, 1890.

GENTLEMEN:—I must say that the Birdsall traction engine I purchased of you this last season is the best I ever handled. I pull my Cayuga Chief thrasher over our steep, hilly roads without any difficulty. The Cayuga Chief thrasher is easy to feed, cleans the grain fit for market, and gives the farmers entire satisfaction.

Respectfully yours, PAUL CHAMBERS.

The Birdsall Co., Baltimore, Md.:

PINDELL, ANNE ARUNDELL CO., MD., Jan. 10th, 1891.

GENTLEMEN:—Our opinion of the Birdsall engine is as follows: We have had fifteen years' experience with other makes of engines in threshing and sawing, and unhesitatingly give the Birdsall the preference to all others. It is economical in fuel, easy and quick to steam, light running and simple to manage. We have been using it constantly for over eighteen months, and it has not cost us one cent for repairs. If we were obliged to buy another engine, it would be a Birdsall every time.

Yours truly, BEVAN & PINDELL.

The Birdsall Co., Baltimore, Md.:

HICKORY, HARFORD CO., MD.

GENTLEMEN:—I have been using the Birdsall machinery for three years, and I think there is nothing better on the market. The engine gives more power for its size and stated capacity than any engine I ever saw. With the mill I have cut as high as 4,200 feet of lumber per day with two men besides myself. I cannot say too much in favor of your goods.

Very truly yours, J. HENRY POOLE.

The Birdsall Co., Baltimore, Md.:

FORESTVILLE, VA., Dec. 18th, 1890.

GENTLEMEN:—We bought one of your twelve-horse power traction engines in the fall of 1889, and can say that it far exceeded our expectations, and is far superior to a great many engines of same class in this country, and cannot be excelled by any on the road. We have drawn our thrasher over hills and mountain roads without any trouble.

Very truly yours, J. W. HARPINE & BRO.

The Birdsall Co., Baltimore, Md.:

FREDERICK, MD., Dec. 31st, 1890.

GENTLEMEN:—We have to say in reference to the working of the Birdsall traction engine we bought of you some time ago, that it is as represented. It is strong and durable, steams easily, very economical in the use of fuel and water, and will travel over any road where a team of horses drawing a wagon can go. If people who contemplated the purchase of an engine knew when they were well off they would by all means invest in a Birdsall.

Very truly yours, ELIAS & JOHN GROVE.

The Birdsall Co., Baltimore, Md.:

ELKTON, MD., Jan. 1st, 1891.

GENTLEMEN:—The traction engine I bought of you is first class in every particular, and I consider it the best road engine in the country. Its pulling powers are something simply wonderful, and I receive words of commendation from all sides in regard to the way it performs.

Very truly yours, WM. T. BOWEN.

The Birdsall Co., Auburn, N. Y.:

NORTH SCRIBA, OSWEGO CO., N. Y., Dec. 11th, 1890.

GENTLEMEN:—The traction engine we bought of you last season fills the bill completely. We are well satisfied with it in every respect. It has never failed to go where we wanted to, and some moves have been over bad roads and steep hills. We would say to any person who contemplates buying an engine that they would not make a mistake in buying a Birdsall.

Respectfully yours, W. H. ENOS & C. S. BURNHAM.

The Birdsall Co., Auburn, N. Y. :

CHAPINVILLE, ONTARIO Co., N. Y., Dec. 13th, 1891.

GENTLEMEN :—The traction engine I bought of you last August has given me perfect satisfaction. I cannot say too much in its favor. I have yet to see anything that will compare with it. It hauls the separator and water tank with ease. The engine is very economical in the use of fuel and water. It cannot be beat for pulling on the roads. Starts and stops readily ; easy to fire, and easy to hold steam. In fact, I honestly believe it is the best engine on the market.

Very truly yours, GEORGE DAILEY.

The Birdsall Co., Auburn, N. Y. :

PORT BYRON, N. Y., Dec. 11th, 1890.

GENTLEMEN :—The engine purchased of you in 1889, I can truthfully say, has fulfilled my most sanguine expectations. I am able to draw my whole outfit with ease over any road here, and there are some bad hills on by beat. Your traction wheels are the most perfect of any I have ever seen. Their grip is something immense. The patent steering gear is far ahead of the old style chain, and is well worth the additional cost. Its economy in the use of fuel causes universal wonder, and everyone remarks, "How little fuel it uses," and can't see how there can be such a difference in engines. I have done two falls' work without any repairs, and my engine is in perfect order now.

To all desiring a traction engine that will not disappoint them, I would say. "Don't fail to get posted on the Birdsall, and take no other."

Very truly yours, FRANK DENMAN.

The Birdsall Co., Auburn, N. Y. :

BEAVER DAMS, CHEMUNG Co., N. Y., Dec. 13th, 1890.

GENTLEMEN :—The Cayuga Chief Thresher I bought of you this last fall has given entire satisfaction, having tried it thoroughly on all kinds of grain, and even on clover seed. As a grain thresher I consider it has no equal on the market,

Very truly yours, MARK LEYOE.

The Birdsall Co., Auburn, N. Y. :

PAVILION, N. Y., Dec. 12th, 1890.

GENTLEMEN :—The engine I purchased of you two years ago has filled the bill in every particular, and I consider it the best engine that runs on wheels.

Respectfully yours, H. N. CHILSON.

The Birdsall Co., Auburn, N. Y. :

PLEASANTVILLE, SULLIVAN Co., IND., Jan. 16th, 1891.

GENTLEMEN :—We would say, in regard to the rig we purchased of you last season, that we are well satisfied with it. When your agent first called on us and represented what kind of an outfit he proposed to sell us, we were inclined to swallow his statement with several grains of allowance. But since getting the outfit, we find he did not make it any too strong, and we can recommend your traction engine and Cayuga Chief Thresher to anyone wanting to buy a first-class threshing outfit. We have not threshed for a man this last fall, but what expressed himself as well pleased with the job done. The grain buyers this section all claim that the Birdsall sends the best cleaned grain to market of any machine in operation yere.

Very truly yours, WESLEY E. BREWER & CHARLES BREWER.

The Birdsall Co., Auburn, N. Y. :

LA FAYETTE, IND., Jan. 13th, 1891.

GENTLEMEN :—The traction engine we purchased of you has proven eminently satisfactory in every respect, and are highly pleased with its workings. We can thresh more wheat with less fuel than any other engine in the country with same capacity of thresher. In short, we do not want any better engine, and believe it would be hard work to find one.

Yours truly, QUAINANCE & ENDEE.

The Birdsall Co., Auburn, N. Y. :

MISHAUKA, IND., Jan. 12th, 1891.

GENTLEMEN :—I have used your threshing outfit for a year, and take pleasure in certifying that yours is machinery that comes up fully to its standard of recommendation. It is all that you claim for it, and no one will have cause for regret if they purchase of you. My outfit has been of no expense to me since I first received it.

Very truly yours, CHARLES E. JUDIE.

The Birdsall Co., Auburn, N. Y. :

MARCELLUS, MICH., Dec. 27th, 1890.

GENTLEMEN :—In regard to the traction engine I purchased of you, will say I never handled an engine that could compare with it. I run it all day, driving a thresher on two tanks of water, and it uses a third less fuel than any engine I know of. When it comes to traveling on the road, it takes the "bakery."

Very truly yours, F. D. PATRICK.

The Birdsall Co., Auburn, N. Y. :

BLOOMINGTON, IND., Jan. 2d, 1891.

GENTLEMEN :—In regard to the machinery I bought of you last year, would say that it has given entire satisfaction. I have been running engines for ten years and I have never found one as good as yours in every respect. I can say what no man has ever said in this country, and that is, I have pulled my thresher over all manner of roads, and have never had to stop to raise steam during the entire fall. All the farmers say we have the best rig that ever threshed in this section.

Very truly yours, J. O. ROBERTSON.

The Birdsall Co., St. Louis, Mo. :

MOUNDS, ILL., Jan. 5th, 1891.

GENTLEMEN :—The machinery I bought of you has given the best of satisfaction. The separator runs smooth and steady ; the high speed of the cylinder makes it take the grain from the feeder with ease. I have used the machine five seasons, and the bearings run as smooth as they did the day I bought it.

Your engine is all one could ask for. It steams easily, uses less fuel and water than the other kinds, and is the best puller on slippery roads I ever saw, (any engine can pull on dry roads), and it cannot be beaten in the yard for furnishing power.

Our variable friction feed saw mill is all you claim for it, and with your patent indicator it is the best thing out for a man not used to the business, at the same time being a very handy thing for an old sawyer. With it I made as true lumber the first time I used the mill as I do now with all my experience.

I am well satisfied with your machinery, and should I have occasion to purchase more I should most certainly buy of the Birdsall Co.

Respectfully yours, WILL NOLEN.

The Birdsall Co., St. Louis, Mo. :

REFORM, Mo., Jan. 6th, 1891.

GENTLEMEN :—We have been running two of your threshing rigs—one four seasons, the other three. The engine we have been using four years we bought second-hand, after its having been used four years, which makes eight years it has been at work. Last winter we run one of your variable friction feed saw mills with it, and have sawed as high as 4,200 feet in eight hours. The variable friction feed on your mills cannot be excelled, and anyone wishing to buy a mill, if they could but see one of these at work, would buy no other.

The separators we are using are 32 inch, and have given perfect satisfaction. The engines are undoubtedly the best ever used in this part of the country, and the most economical in the use of fuel and water, and easily managed on rough roads.

We cannot recommend your machinery too highly. There are many things that we know to be facts that we would like to mention, but think we have said enough.

With our best wishes for your future success, we remain,

Yours respectfully, G. W. STUCKER & SON.

The Birdsall Co., Auburn, N. Y.:

GENTLEMEN:—The traction engine I bought of you three years ago has given entire satisfaction. It has done all I ever asked of it in threshing and moving the rig from job to job, running my 24 inch buhr stone feed mill and corn sheller. It also runs a 52 inch circular saw in good shape, and is a dandy to pull a road scraper for scraping roads.

NILES, CAYUGA Co., N. Y., Jan. 10th, 1891.

Very truly yours, HENRY HARTER.

The Birdsall Co., Auburn, N. Y.:

GENTLEMEN:—The Cayuga Chief Separator I bought of you last fall has given the best of satisfaction, both to the farmers and to ourselves, of any machine ever introduced into this part of the country. It is the stillest and smoothest running machine we ever saw, and it handles the grain the best of them all. We know by experience, for we have run several different kinds of machines; in fact we run four different kinds last fall, but the Cayuga Chief takes the lead of them all.

Dexter, Mich., Jan. 4th, 1891.

Very truly yours, BELL & HOWARD.

The Birdsall Co.:

GENTLEMEN:—I write to let you know what I think of the Birdsall twelve-horse power engine, vibrating thresher and variable friction feed saw mill. All I can say about the machinery is that it will do all and more than you claim for it, and the longer I run it the better I like it.

SCOTLAND, Md., Dec. 22nd, 1890.

Wishing the company success, which they deserve, I remain,

Very respectfully yours, T. W. LANGLEY.

The Birdsall Co., Baltimore, Md.:

GENTLEMEN:—It gives me pleasure to testify in regard to the saw mill and engine I bought of you last fall. I refer to the 20-horse power skid engine and variable friction feed saw mill. It has given perfect satisfaction and is all you claim for it, and knowing what I do about saw mills, I would not own any other kind of an outfit. It is acknowledged by all the saw mill men around here, to be the best in this section of the country.

HANOVER C. H., Va., Dec. 15th, 1890.

I cut from ten to twelve thousand feet of lumber every day, and do it easily. My sawyer, who has had 18 years experience, says it is the best mill he ever handled. I can simply say that I am more than pleased with the whole outfit.

Very truly yours, THOMAS WATSON.

The Birdsall Co., Baltimore, Md.:

DEAR SIR:—The traction engine and separator I bought of you is the best rig I ever operated. I have been in the threshing and hay baling business for ten years. I pull my hay press and water tank with ease. I never undertook to go anywhere with my outfit, but what I got there and in good shape, too, whether up hill or down; through mud or sand she travels right along.

NOTTINGHAM, CHESTER Co., Pa., Dec. 22nd, 1890.

I pulled a sixty horse power boiler, weighing six tons, up one of the worst hills we have in our vicinity. The Birdsall is the most economical in the use of fuel of any engine I ever operated. It is a very simple engine to manage, and the most durable of any I ever saw or heard of.

The Cayuga Chief Separator is the best thrasher out. It does its work in every particular in the very best manner. I can thresh two bushels of wheat a minute on the average, and clean it fit for market. Its capacity is all that one man can feed into the cylinder. The farmers for whom I have threshed, expressed themselves as well pleased. It is the only machine around this vicinity that threshes the grain out of the straw, cleaning it fit for market.

I would say to threshermen and farmers, that I consider the Birdsall Co. an honorable concern to deal with, and can conscientiously recommend your machinery to all.

Respectfully yours, T. W. AYIAN.

The Birdsall Co., Baltimore, Md.:

GENTLEMEN:—It is with pleasure that I tender this testimonial regarding the merits of your traction engine. I have owned two engines of other makes of same rated horsepower, but have never been able to develop as much power with either of them as with the "Birdsall." This I attribute to the fact that it takes steam quickly, uses it quickly and exhausts it quickly, before it can condense, thus getting the full expansive power of the steam which is superheated in its course through the steam pipe as it passes down through the boiler to the steam chest, thus making it utterly impossible for the steam to condense before it reaches the cylinder. I also find it the most economical in the use of fuel of any engine I ever saw run. I have threshed a thousand bushels of wheat, moved three miles, drawing the thresher and stacker, and used less than one thousand pounds of coal.

GALENA, MD., Jan. 6th, 1892.

The traction gear is the nearest to perfection to any I ever saw, and I have examined a great many different makes. The open face traction wheels and springs under boiler are points not to be overlooked. The patent steering device and four barrel suspended water tank are great conveniences and an improvement on anything in the market. The engine is in every particular a first-class machine, and I cheerfully recommend it to anyone who needs a first-class engine.

Very truly yours, J. ROBERT WILSON.

Mr. F. H. Marshall, Esq., Darlington Ind.:

DEAR SIR:—In closing up our business, allow me to express to you my appreciation of the work done by you and your "Birdsall" engine in plowing the trenches of our lines. As you know, the requirement was to draw the plow through from six to twenty-six inches of solid gravel that had been hardened by years of travel, or in many cases pounded limestone. After three unsuccessful trials of engines of other makes, your engine was brought in and pulled us through to a successful finish. It will be no detraction from the merits of your engine to say that this result was in a great measure due to your management of it. In our work, the use of your machinery effected a material saving to us, and in future work of this kind I will know, without experiment, the man and machinery to employ.

THE PEOPLE'S NATURAL GAS CO., OF INDIANA, }
CRAWFORDSVILLE, IND., Dec. 3rd, 1891. }

Very truly yours, JOHN McALEVY, Supt.

